"Am I what I can do?" – Grade 10 learners' choices between Mathematics and Mathematical Literacy and questions of identity

By

Dorcas Malahlela

381578

PSCY 7022

Plagiarism Declaration

“I declare that this research project is my own, unaided work. It has not been submitted before for any other degree or examination at this or any other university”

Name: _____

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Abstract

Subject choices afford differential opportunities to children when they leave school. Mathematics offers more elite, post-school education and employment opportunities. The introduction of Mathematical Literacy in post-Apartheid schooling was framed as a democratic imperative to provide all learners with some mathematical knowledge. The supposed choice between the two subjects has to be made by adolescents at the end of grade 9 for grade 10 to grade 12.However, subjects are not particularly 'chosen' by the learners. Rather, the schools allocate them to a stream that is determined by their previous academic performance. Subject allocation interacts with the self-perceptions that adolescents have of their capability to succeed in school. In Phase one, 356 learners in two schools were surveyed. The Mathematics learners surveyed attributed their subject choice primarily to their intended careers and tertiary study. Mathematical Literacy learners emphasised the ease of the subject, that they could not qualify for Mathematics, and that they did not feel that they had the required skills for Mathematics. The perception that a lack of ability and natural skill is the fault of the learner is entrenched by these statements, and serves as a foundation for the acceptance of inequality. In Phase two, the data from the individual interviews with11 adolescent girls was analysed, and the themes formulated were that Mathematical Literacy was easier and more accessible for the Mathematical Literacy learners, that high school was very different from primary school, that the cultural capital conferred by Mathematics will allow them to live up to the investments from their parents and teachers, and that sex and sexuality poses a threat to their futures.Subjects that a learner does at school impact on identity formation in that it controls the cultural capital that an individual has access to.Subject allocation confers senses of self-worth, capability, and opportunity. Subject 'choice' directs the path of the learner/individual, emphasising the school's (as institution) role in the reproduction of inequalities through race, class and gender.

Keywords: Mathematics, Mathematical Literacy, Identity, Cultural capital, Schooling

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Chapter 1: Context of the Research Project

1.1 Introduction

This project aimed to explore what Grade ten learners' choice between Mathematics and Mathematical Literacy can tell us about their construction of identity. Schooling and future career opportunities are a central aspect of adolescent life, and the choice of school subjects at this stage become the potential starting point for opportunities in life. Particular subjects can (and do) determine pathways that learners can take in and after schooling. The sciences in particular, open up pathways that have greater and stronger ties to academic pathways, that is, further study in higher education institutions. The reality is that at the end of Grade nine, learners, who decide to continue in school, have to choose subjectswith the influence of their parents and teachers that will be their realm of study until they complete high school and this choice can determine the direction of their lives.

Investigating this process could, therefore, potentially offer insight into how adolescents perceive themselves as capable beings, giving a sense of their self-esteem, self-perceptions of their efficacy, and an emerging sense of identity in the context of their socioeconomic conditions and the politics of South Africa. The study situates young people and schools in a particular sociohistorical context and challenges the conventional, conservative belief/myth that education is a meritocratic realm (Fine, 2004), in which those who succeed are the hard workers who put their minds to success, liberating themselves from whatever constraints are characteristic of their class or background. "On this idealistic view of things, there would be no need for a progressive politics: we would be in an eternal state of progress, for liberty would be our natural condition" (McHoul & Grace, 1993, p. 48). Such a point of view would be problematic in view of the past (the quite recent past in South Africa's case), as inequality, injustice and its effects continue to be an issue for many of the country's inhabitants. An attempt to unpack how adolescents, particularly Black girls, see and situate themselves, and their choices, in their world would provide insight into the (dis)continuous mechanisms of opportunity, education, 'race', gender, and identity construction.

Since the change to democratic rule and the removal of legislative discrimination in South Africa, there have been major reforms carried out, particularly in education (Fakier & Waghiid,

2004). These changes aim at ensuring equality in educational offerings and improving the overall quality of education for all people. A key aspect of these reforms included changes in curriculum. However, historical features of unequal access to education still persist at multiple levels. The implementation of the process of transformation entails a disconnection between policy and what is experienced in actuality; and questions of the effects on experiences for young people who are developing their identities, emerge. Perpetuations of inequality in education, particularly secondary school education, have a major impact on access to tertiary education and job opportunities.

The South African Education System is structured in such a way that schooling is only mandatory until the end of the ninth year (Grade 9). It is structured as follows:

- Foundation Phase (FP) – Grade 1-3
- Intermediate Phase (IP) – Grade 4-6
- Senior Phase (SP) – Grade 7-9
- Further Education and Training (FET) Phase – Grade 10-12 (DoBE, 2011)

Grade ten is the first of three years in the FET Phase, culminating in examinations for the National Senior Certificate. At the end of Grade nine, learners can either continue their education in high school (which is considered as a more academic pathway), or attend a vocational college, or embark on an accredited apprenticeship or learnership, towards a National Vocational Certificate. These alternative pathways are, however, under-resourced, undervalued and underutilised, making school the default route. This project focuses on the academic stream within schools at the beginning of the Further Education and Training phase, that is, Grade ten. This is a critical moment for young people as they choose their matric subjects, including making a decision about whether to take Mathematics or Mathematical Literacy[1].

1.2 Education in South African History

"Race is a *construction*, a set of fully social *relationships*" that entail "realities of differential power and histories" (Apple, 2004, p. 75). In the history of South African education, race differences were used as a way to entrench the markedly different levels and quality of access to services, such as education. By teaching particular race groups specific subjects and not others,

[1]In this research project, 'mathematics' refers to the field, while 'Mathematics' refers to the subject taught in schools, as opposed to Mathematical Literacy.

the message that was communicated was that these subjects and their related fields are not the realm of these people, and neither are the related benefits. To this point, education served to define the limitations of race groups *for them* (McHoul & Grace, 1993).

The Bantu Education Act of 1954 formalised the racial segregation of education facilities (Khuzwayo, 2005). "The apartheid policies of Nationalist government were explicitly engineered to create minority group control and to provide inferior education for the majority in order to sustain its position of social, political and economic subjugation. Educational resources were not only limited, but also differentially distributed" (Khuzwayo, 2005, p. 316). Many schools for black learners did not offer senior secondary level mathematics. A quote from Verwoerd captures the apartheid government's thought: "What is the use of teaching the Bantu child mathematics when it cannot use it in practice?" (Verwoerd, 1953, cited in Khuzwayo, 2005, p. 310). The mathematics that was taught, if available, went no further than elementary arithmetic, and did not in any way offer the mathematical skills and knowledge needed for tertiary education (Khuzwayo, 2005). Those who persisted did not learn very much, with very few continuing in school to grade twelve, and even fewer passing the matric examinations (Bray, Gooskens, Kahn, Moses, & Seekings, 2010).

Foundation for Research Development statistics from 1993[2] show that in 1990, white learners had the highest participation rate in matriculation mathematics (64% of white learners) while black learners had the least at 24%. Though 65% of these black learners attempted mathematics at the higher grade, only 15% passed. 60% of white learners took mathematics at the higher grade, and 97% of these learners passed (Reddy, 2005). Data from the South African Certification Council (SAFCERT) show that though the number of learners enrolled in schools for matric increased dramatically around 1993/4, pass rates did not increase at the same rate –the number of passes increased by only 7%, and the number of exemption passes increased by merely 3% (Reddy, 2005).Alarmingly, only 1% of formerly white schools offered only standard grade mathematics between 1998 and 2003, compared to formerly black schools where 17% in 1998, 34% in 2001 and 25% in 2003 offered only standard grade mathematics (Reddy, 2005). Mathematics higher grade learners were consistently more predominant in formerly white

[2]This data describes 'Black' as individuals of African descent. It does not include Coloured or Indian learners.

schools. The inequalities from apartheid classifications and allocation of resources persist in schools today, with unequal resources and quality of teachers.

The aims of apartheid were thus furthered: without adequate basic schooling, anyone who wanted to study further, or go into vocations that required specialised mathematical knowledge, such as engineering, the natural and some social sciences and medicine, could not become qualified as they lacked the relevant scientific preparation in schooling. In addition, those who became teachers did not possess the necessary skills and knowledge, and, along with a limited curriculum, another generation of learners would not be taught the mathematics, among other subjects, that their white counterparts were learning, ensuring the steady (re)production of inequality. Apple (2004) describes this as producing a context where race corresponds with unequal relations in economic, social and cultural capital, and the education system perpetuates unequal means to convert one form of capital to another in society.

Parents' education has also been found to play a role in their children's schooling. "Intergenerational mobility," or the chance of a child receiving a potentially better education than their parents (when their parents had had poor or little education) is limited in most societies (Thomas, 1996). In rigid societies with little or no mobility, parents' education fully determines the education their child will receive. Parental education has the greatest impact on children's education among Black[3] people in South Africa, in that intergenerational mobility is lowest among these groups (Thomas, 1996). Inferior education traps the working class and poor, reducing their chances of finding employment and facing long periods without employment, and similarly, superior education enables the upper classes to maintain privilege and entrench exclusivity (Bray, Gooskens, Kahn, Moses, & Seekings, 2010). Research has shown that more affluent black parents moved their children out of schools in black neighbourhoods to more resourced, predominantly white and suburban schools (Deluca & Rosenblatt, 2010 in the USA, and Msila, 2009 in South Africa). Thus, while a few individuals may escape their racialized working class backgrounds, they leave behind schools that remain under-resourced and perpetually disadvantaged.

[3]Black, in this research project, refers to the apartheid categories of Black African, Coloured and Indian 'races.'

1.3 Schools in contemporary, post-Apartheid South Africa

The shortage of adequately trained mathematics teachers continues in the present. In 2010, there was a reported shortage of mathematics and science teachers in 10% of South African schools; the demand for teachers rising with the implementation of Mathematical literacy as a compulsory subject for all learners not enrolled for Mathematics (Segar, 2012). Many teachers teach more than one subject and more than one grade, sometimes simultaneously, and some of the worst affected schools are those in rural communities (Aboobacher, 2012). Trained teachers are lacking, with the Concerned Maths Educators (CME) group stating that more than half of mathematics and science teachers do not have the required qualifications (Mohlala, 2008). Learners in under-resourced schools are most likely to be materially underprivileged (Aboobacher, 2012), and are thus unlikely to be able to afford extra academic assistance in the form of tutoring, or sourcing additional material. Teachers unfamiliar with the curriculum content itself are of course less likely to be able to help learners, and are more likely to resort to engaging superficially with the content, such as merely writing out notes on the board as they appear in the textbook, or reading out the material to the learners (Bray, Gooskens, Kahn, Moses, & Seekings, 2010). This fosters an environment where learners do not engage with the material, and those who find it difficult to understand will fail to grasp content. This negatively affects their participation and success in the classroom. “Many children fail to acquire skills and qualifications despite investing many years of effort, and despite the sacrifices made by their families to keep them in school” (Bray, Gooskens, Kahn, Moses, & Seekings, 2010, p. 171).

The CME are concerned that access to certain paths of further education that even the previous Standard grade mathematics allowed for are removed, and that the subjects Mathematics and Mathematical Literacy are two extremes, one being too difficult and the other offering little or no preparation for higher education possibilities (Mohlala, 2008). Questions on the adequacy of the curriculum have also resulted in the development and implementation of the National Benchmark Tests (NBT). The NBTs are used by higher education institutions as a means to comprehend the meanings of the results of the National Senior Certificate examinations, as interpretation of these results is made difficult by “no Higher/Standard Grade differentiation, three totally new subjects, and no piloting” (Yeld, 2007, p. 614). Issues with the curriculum, its implementation and the lack of adequate teachers creates a context where learners do not have equal opportunities and previously institutionalised inequalities are perpetuated. Inequalities are

not institutionalised as during apartheid, but there is a lack of coherence in enacting aims and intentions, and a lack of management and distribution of resources.

It is emphasised in the Curriculum and Assessment Policy Statements (CAPS) which is an extension of the outcomes-based curriculum,[4] that one of the teachers' roles is to promote discourse where learners listen and respond to, and question one another and the teacher about the validity of their solutions, conjectures, answers, etc. This approach is explicitly political (Engelbrecht & Harding, 2008). Making education one of the main aspects of redress through a model of equal access constitutes the knowledge building process as a process of (re)making the self and society (Freire & Macedo, 1987). But the differences in the offering of subjects, how they are enacted, and how they open up certain paths and close off others, still maintains class distinctions. Subjects like Mathematics still act as 'gate-keepers' to further education and discourses of power (Christiansen, 2006).

Particularly, the state describes in their curriculum documents, "symbolic images of what [they consider] worthwhile knowledge and pedagogic practices for schooling that will advance these new transformation ideals" (Parker, 2006, p. 59). The curriculum documents focus on abstract concepts at the expense of clearly explicating what the curriculum should be doing in practice. This project is particularly concerned with how these aspects (school context, curriculum change, qualitative perceptions of difference and discourses) have an effect on the burgeoning identity development of the adolescents who have to make the choice between Mathematics and Mathematical Literacy.

"From location of the school within macroregularoty systems characterised by nation, state, and school district laws and educational policies to the microregulatory systems that involve the minute-to-minute interactions between teachers and individual learners, schools are complex, multilevel, regulatory processes"(Eccles, 2004, p. 126). For adolescents, school and education forms a significant part of their present lives and affects their futures. For Grade ten learners in particular, this significance is magnified when they have to choose subjects that may potentially influence their lives appreciably. Gellat(1989) describes decision making as a human process

[4]Outcomes-based curriculum was meant to focus less on rote learning and memorisation, and more on developing engagement with the subject content, fostering understanding through discovery, and creating an environment where learners can create knowledge together (Fakier & Waghiid, 2004).

that is neither sequential, systematic nor scientific, to re/arrange information for the purposes of choice or action. Gellat further describes a capable decision maker as a person who can be positive, confident and comfortable in the face of uncertainty, or in a situation that is ambiguous or lends itself to doubt (1989). For adolescents having to make a choice of which subjects to take at the beginning of grade 10, this choice is neither linear, straightforward, nor altogether individual. The choice they have to make between subjects has both far-reaching and short term consequences.

1.4Mathematics

Mathematics encompasses what has been described as a philosophy, a science, or a field of knowledge in its own right. De Lange (2003) states that "mathematical concepts, structures and ideas have been invented as tools to organise phenomena in the natural, social, and mental worlds" (p.78). The Organisation for Economic Cooperation and Development (OECD) expert group describe four phenomenological categories that constitute mathematics: Quantity, size and shape, change and relationships, and uncertainty (cited in De Lange, 2003). 'Quantity' focuses on quantifying the world. This includes understanding relative size, recognising patterns, and being able to use numbers to represent aspects of the world. 'Size and shape' refers explicitly to patterns in the world, for example, buildings, geographical layout, and shadows. "Geometric patterns can serve as relative simple models of many kinds of phenomena, and their study is desirable at all levels" (Grunbaum, 1985, cited in Ojose, 2011, p.95). Studying shapes and patterns is linked to 'grasping space', a concept from Freudenthal, who described this as learning to now and explore to live in the spaces in which we live with more understanding (Ojose, 2011). Change occurs constantly in the world around us, and the ability to think in terms of relationships (functional thinking) integrates the ability to observe and quantify change (De Lange, 2003). 'Uncertainty' involves thinking about data and chance, looking at different sources of information and using them to predict occurrences in the world. All these aspects of mathematics include being able to observe and represent the world symbolically/mathematically, and being able to utilise this information for a purpose.

Mathematics is taught in most schools across the world and is considered as an important component of education(Bishop, 1997). Teaching some basic level of mathematical skill is

essential for individuals to be able to exist in modern societies, to be able to interpret figures in the media, read receipts and forms, among other quotidian, numerate activities.

In 2006 the Department of Basic Education introduced Mathematical Literacy, and where Mathematics was once optional, learners now have to choose one of either of these subjects(Venkat & Graven, 2008). Curriculum and Assessment Policy Statements (CAPS) were released for both subjects. The practice of mathematical knowledge is described as a "human activity" (DoBE, 2011a), in other words, naturalising it. It helps learners to develop mental processes that develop critical thinking, accuracy, logic and problem solving that will aid processes of making decisions (DoBE, 2011a). It also endeavours to teach creative thinking and to foster an understanding of the world (DoBE, 2011a).

Aims for the teaching and learning of Mathematics are clear: to develop computational fluency without the reliance on calculators; to teach mathematical modelling; to show understanding and to work with the number system; to develop cognitive and problem-solving skills; to promote the accessibility of the subject; to foster engagement with the subject including the history of Mathematics; and to prepare high school learners for further education (DoBE, 2011b). These aims are heavy with the interpretation of the subject as markedly productive, for instance, with the aim of producing individuals who are prepared for further study, and improving after-school opportunities to find employment (Segar, 2012).

However, there are some critiques of Mathematics as it is taught. It is argued that Mathematics does not adequately prepare learners for the world beyond schooling and the world of work. The emphasis in Mathematics is on abstract concepts, intra-mathematical connections and logic and rigour, as opposed to concrete concepts, critique and interpretation, and application (Venkat, 2007). Some critics, like Davis (2005) "have argued that subjects taught in this way simply cannot produce mathematical working in coherent ways, due to the fact that their content is not organised around the structure of mathematics as a discipline, i.e. the way in which mathematics curricula are traditionally organised" (cited in Venkat, 2010, p.53). In the 2003 Trends in International Mathematics and Science Study (TIMSS), South African grade 8 learners performed worse than any of the other participating countries in mathematics and science, and South African learners tend to perform worse than even other poorer African countries in such assessments compared to children from Botswana, Ghana and Egypt (Bray, Gooskens, Kahn,

Moses, & Seekings, 2010). There was improvement from previous results in 2001, but South African learners still scored poorly; the highest scores for South Africa are only on the level of mid-level scorers in the top scoring countries such as Japan and Hong Kong (Reddi, 2006). Learners in formerly White schools performed the best overall in the country, followed by learners in formerly Indian schools, formerly Coloured schools, with learners from formerly Black schools performing the worst (Reddi, 2006). Inadequate teachers, a lack of resources, and lack of learner and teacher motivation have been posited as explanations for poor performance. 'Parrot' learning and the inadequacy of subject material have been used as arguments that support the implementation of a subject like Mathematical Literacy, contrasting it with the content-heavy, time-restricted pressures present in teaching and learning Mathematics (Venkat, 2007) which may not be relevant for all people in all domains of work.

1.5Mathematical Literacy

The offering of Mathematics in schools was markedly unequal across 'races', entrenched by the Apartheid-sanctioned education system to keep the marginalised, marginalised, and the advantaged, advantaged. Mathematics has a certain kind of power as a discourse, empowering those who have the knowledge, and limiting those who don't. Therefore, the introduction of Mathematical Literacy was seen as part of a larger agenda to overturn the unjust distribution of power and control that characterises South African society and history (Parker, 2006). The introduction of Mathematical Literacy ostensibly aims to spread mathematical knowledge to groups who were previously denied it, and also to create contributing members of society (DoBE, 2011).

The idea of mathematical *literacy* is based on Gee's notion of literacy, relating it to the "mastery of or fluent control over a secondary discourse," (Venkat, 2007, p. 76) which are ways of being in the world purposively endorsed or practised, very often in contexts like schools. The act of 'choosing' between Mathematics and Mathematical Literacy becomes a choice of particular forms of knowledge and the modes of power they inhabit. Before the implementation of this curriculum change, learners' only options were between Higher or Standard grade mathematics, or for the majority of learners, no mathematics at all. With the curriculum changes of 2006, all learners must choose one of two forms of mathematics. However, in many schools and for many children, the choice between the two subjects is not an open one. Children are allocated to either

subject in terms of the systems used before the implementation of outcomes-based education: those who would have taken higher grade mathematics and learners who were strong performers in standard grade mathematics, are allocated to Mathematics, and weak standard grade performers and those who would not have taken mathematics at all are allocated to Mathematical Literacy (Venkat & Graven, 2008). Teachers and school administrators demonstrate a tendency to enact a sense of which learners they feel "are able and which are not" (Apple, 2004, p. 78). This 'sense' is strongly anchored in raced and class-based terms, which are not only mirrored, but *produced* in schools (Apple, 2004). Racism can be so thoroughly entrenched that its enactment can occur without an institutional imperative (e.g. the law) and even by those systematically disadvantaged by it. In Fine's (2004) work, she found that when children were asked to choose between standard and advanced tracks in US education, they tended to stick to race-based decisions, with white children in the advanced and black children in the standard track. The 'old' frames of reference are still in use to some extent, old and discriminatory discourses of power are being enacted.

The meaning of literacy is contentious. Walsh defines literacy as "a creative activity through which learners can begin to analyse and interpret their own lived experiences, make connections between these experiences and those of others, and, in the process, extend both consciousness and understanding" (Venkat, 2007, p. 76). In international circles, mathematical literacy is often used synonymously with numeracy and refers to an individual's competence in basic mathematics skills (Christiansen, 2007), a requirement for the understanding of more complex mathematics.Being numerate means to be able to use knowledge and understanding about numbers for calculation and data handling to solve problems and make decisions (National Numeracy, 2013). Number skills influence how we live in the world, and limits or opens up access to it and the information in it. There is also a key emphasis on everyday contexts and use, rather than abstract classroom knowledge. "[To] be numerate is to have the capacity to use maths effectively in context" (Bowie & Frith, 2006). Steen (2001) specifies further this concept of Numeracy/Quantitative literacy, as different to mathematics, moving from simple to advanced concepts, building on what has been learnt systematically. Quantitative literacy empowers people through giving them tools to allow them to think for themselves, ask intelligent questions and confront authority with confidence and is a combination of numeracy and mathematical skills. "Most adults who do possess quantitative literacy learned it outside of the mathematics

classroom in much the same way they learned about computers. They developed some number sense, arithmetic confidence and experience" (Usiskin, 2001, p. 80).

Schools in England teach numeracy and some schools in some parts of the United States of America teach quantitative literacy (Usiskin, 2001). In contrast to the teaching of Mathematical Literacy in South Africa, in these contexts numeracy and quantitative literacy are not considered alternatives to mathematics, but as additives that contribute to mathematical understanding or as remedial work to address problems in fundamental mathematical understanding (Bowie & Frith, 2006). By contrast, in the South Africa schooling system, Mathematics and Mathematical Literacy are set up as alternatives to one another.

The addition of the Mathematical Literacy subject has been framed as an extension of the ANC's aims to transform education in South Africa (Bray, Gooskens, Kahn, Moses, & Seekings, 2010). Freire (1985) states that teaching adults to read and write is a political act – by teaching reading of the 'word', the adult comes to know the 'world' that they inhabit. Merely "memorising the description of an object does not constitute knowing it" (Freire & Macedo, 1987, p.33). From this perspective, literacy involves some awareness of the discourse and context of the person, their world, and the person in the world.

The offering of Mathematical Literacy is understood as a form of redress. Learners from groups who would have not had access to Mathematics in the past are offered Mathematical Literacy. Redress and transformation are explicitly political, and the fact that learners *must* 'pick' either one of the subjects, as opposed to being able to choose either or opt out entirely, enacts control over the individuals doing the choosing. But the 'choice' is not just political or symbolic: "it is wholly an economic concept in which unattached individuals – supposedly making 'rational' choices in an unfettered market – will ultimately lead to a better society" (Apple, 2004, p. 74). This is particularly relevant regarding the DoBE's statements about Mathematical Literacy aiming to create a "contributing worker" and a "participating citizen" (D0BE, 2011a). Many learners in South African schools leave school with less than basic literacy (reading and writing) and numeracy skills, and data have shown a correlation between a learner's literacy and numeracy skills and the neighbourhood in which they live (Bray, Gooskens, Kahn, Moses, & Seekings, 2010). It is these learners who are more likely to 'choose', or be placed in, Mathematical Literacy classes rather than Mathematics classes. It is therefore evident that

ideology and discourses of power play a significant role in the choice, whether it is an ostensibly open choice or not.Questions are raised about the relationships between the content of each subject: the emphasis on life-preparation in the Mathematical Literacy curriculum does not translate particularly well in the act of teaching, and the use of contexts is facile, requiring some knowledge to fully understand them (Bowie & Frith, 2006).There is not much of an attempt at directing the attention of learners and teachers at truly transformative issues, only at developing competencies for final assessment (Christiansen, 2006).

The Mathematical Literacy subject was introduced in the beginning of 2006 as an alternative to Mathematics for Grade ten learners, part of the Further Education and Training (FET) phase in the South African schooling system (Venkat, 2007). Mathematical Literacy is described as subject that will allow learners (including Adult learners) "to make some sense of, participate in and contribute to the 21st century world – a world characterised by numbers, numerically based arguments and data represented and misrepresented in a number of different ways" (DoBE,2011b, p.8). The implementation of the teaching and learning of this subject represents an ostensibly equalising discourse, aiming and intending to provide *all* learners with some form of mathematical knowledge. There is a focus on competencies and skills that will allow learners to solve problems, manage their resources and make general life decisions using mathematical thought (DoBE, 2011b). The aim of Mathematical Literacy is not to teach mathematics in a way that articulates narrow scientific knowledge requirements of higher education, but to utilise the elementary mathematical content learned in previous years of schooling and apply it in the activity of contextualising mathematics in everyday situations (DoBE, 2011b).

Mathematical Literacy has five key elements: teaching learners to make sense of numeric and statistical arguments faced in everyday life; using authentic contexts; equipping learners with the necessary skills and knowledge needed to solve problems in contexts they may encounter in their lives and in their workplace; developing decision-making and communication; and using integrated content to solve problems (DoBE, 2011b). These are value-laden statements about the 'adult world' for all individuals, assuming a primarily capitalist context where individual skills of this kind are necessary for any kind of success. The CAPS emphasises that progression in this learning area is focused not on mathematical knowledge, but on developing advancement and complexity in knowledge and skills (DoBE, 2011b). Instead of the general aims, as stated in the

Mathematics curriculum statement, Mathematical Literacy has application topics, which include measurement, maps, data handling and probability (DoBE, 2011b). The creation of Mathematical Literacy was introduced to reach the 200,000 learners leaving Grade 12 without mathematics, and the 200,000 who were failing mathematics (Christiansen, 2006). Apple (2004, p. 78) describes situations where Black learners and learners in government subsidised lunch programs in the USA (which is commonly used as an indicator of poverty in school) were the ones most likely to be placed in 'lower track' programs and given career advice that unequivocally secures limited or no mobility, but also frames the learner as "less worthy" compared to other learners in higher 'tracks'. The 'valued' subjects of mathematics and sciences are used as gate keeping tools, limiting career and further education prospects. That, in addition to the sentiment that learners were not acquiring critical thinking or problem solving skills (Engelbrecht & Harding, 2008), frames the argument for the introduction of Mathematical Literacy, as a means to ostensibly equalise opportunity, however, it is evident that the opportunity gap between Mathematics and Mathematical Literacy learners remains.

Venkati and Graven (2008) conducted a study of the perceptions of Grade ten learners who took Mathematical Literacy, and they found that negative perceptions of mathematics learning in Grade 9 had been transformed into positive perceptions of learning Mathematical Literacy in Grade 10. The change in the nature of interaction and classroom tasks, one aspect of difference to Mathematics, was found as a positively contributing factor to changes in disposition, with learners commenting that Mathematical Literacy appeared more 'useful', and linked to everyday occurrences (Venkat & Graven, 2008). This frames Venkatakrishnan and Graven's(2006) view that Mathematical Literacy is seen as suitable for learners who do not intend to further their studies in a field that requires extensive mathematical knowledge or into vocations with the same requirements. However, there are critiques of Mathematical Literacy in that there are ambiguities with what is meant by literacy and a general lack of coherence in the intentions of the learning area and the realities of it being carried out. In particular, there are concerns about it "degenerating into 21st century arithmetic" (Julie, 2006, p. 62). This is problematic as it would be a regression to the apartheid regime's intentions and actions to restrict (mainly poor and black) learners to skills that would not provide opportunities for mobility economically or socially.

Chapter 2: Theoretical Framework

2.1 Bourdieu's notion of cultural capital

The question of choice between the subjects is problematic. As can be seen from the literature discussed in Chapter one, the 'choice' between Mathematics and Mathematical Literacy isn't really a 'choice.' Learners are assigned to a stream according to their performance in Grade nine, at times in line with the same criteria used before the introduction of the outcomes-based curriculum. Bourdieu's (1986) notion of capital can be used to understand this 'choice'. Capital exists in three forms: economic, cultural and social capital. *Economic capital* can be easily and immediately converted to money and institutions of ownership of physical objects like property; *cultural capital*, under certain conditions, can also be converted to money and exists in institutions such as educational qualifications; and *social capital* is made up of social 'connections' and may be institutionalised in forms such as titles or social standing (Bourdieu, 1986). Cultural capital itself exists in three forms: the embodied state, which are the enduring dispositions of the mind and body; the objectified state, which are cultural goods; and the institutionalised state, which is similar to the objectified state, but has different properties, as seen in the institution of education, for example (Bourdieu, 1986). Cultural capital is that which, whether material or not, society sees as valuable and important. These notions of capital arose when Bourdieu noted different academic success in children from different social classes in France, an ostensibly 'equal' society. Bourdieu posits that cultural capital is that which is valued, but which is perceived of as being 'priceless', such as education, culture, knowledge and ideas.

The reality is that these things that are perceived as 'priceless' are actually constructed through expenditures of economic capital. "Talent is itself the product of an investment of time and cultural capital" (Bourdieu, 1986, p. 48). A child who is well read, shows aptitude academically and frequently asks questions when they don't understand, isn't simply a 'bright' child. Their context, in one way or another (most frequently through economic capital) opens up resources to allow them the means to read more, time to ask questions, and thus show more of their 'potential' than a child who does not live in similar circumstances. The 'capital' in both time and money invested by the family is reflected in the academic gains of the child. Economic capital directly relates to cultural capital in that it allows for the acquisition and accrual of cultural capital which then in turn is reproduced and again converted into economic gain. It is an aspect

of power *through access*, in that economical means provide access to culture, and culture legitimates social structures by perpetuating them and keeping them exclusive through the processes in which they are gained. The things that we 'have' and what they 'allow' us to 'do' shape how we live in the world. Mathematics and Mathematical Literacy act as different kinds of cultural capital – subject choice, or rather, allocations, deliberately reproduce work opportunities and limitations from the schooling level.

"According to Foucault, the ostentatious display of sovereign authority through the spectacle of the scaffold was displaced in the modern era by the subtle logic of a disciplinary regime necessary for the management of a docile yet productive component social body" (Lewis, 2009, p173). Schools, as institutions, do not only confer subject knowledge to children, they also confer disciplinary knowledge, that is, they learn what is expected of them as individuals in their contexts. Children come to learn what they can do, what they are capable of, and what paths they can take through the institutions that they are a part of (schools, religions). This develops from initially governing the individual (physically, overtly, explicitly) to making the individual govern themselves (Milchman & Rosenberg, 2009). The learner is the subject, and is made subject to. Disciplinary mechanisms (through the subject knowledge of mathematics and the institution of the school and its teachers) differentiate, homogenise, exclude and normalise the individual – the 'social orthopaedics' of schooling and education corrects and directs the potential of learners (Foucault, 1979 & 2000, cited in Lewis, 2009). The selectedness (Bourdieu, 1977, 1986) of subjects controls how many learners are permitted into the subjects (here, Mathematics) and also informs the learners about who they are and can be through social learning both overt and implicit, violent and internalised, from without and from within.

2.2 Identity

The Mathematical Literacy CAPS has explicit descriptions of intent regarding identity: Mathematical Literacy "should enable the learner to become a self-managing person, a contributing worker and a participating citizen" (DoBE, 2011b, p.8). These constructs of activity, of generalised and vague participation and contribution, contrast with the constructs of action that characterise the Mathematics CAPS document. The conception of full political and economic citizenship, particularly frames the Mathematics learner as being prepared for higher education. Does this mean that there are different types of identities specifically required and/or

produced by either of these subjects? Christiansen (2006) argues that the framing of these two subjects in these ways, constructs those learners who choose Mathematical Literacy as less able, and thus destined for less social and economic mobility than their Mathematics counterparts. These different subjects therefore produce or require certain types of individuals, influencing the types of narratives they produce, influencing their view of themselves in the world, all mediated by the discourses being enacted. This communicates to the child the kind of adult person that should be developed through the educational process.

Marcia's definition of identity is that it is "an existential position, to an inner organisation of need, abilities, and self-perceptions as well as to a socio-political stance" (Marcia, 1980, p. 159). His definition emphasises the development of the psychoanalytic ego, building on Erikson's "epigenetically based psychosocial task" (Marcia, 1980, p. 159) of identity development. Erikson himself thought of identity as a "unification of what is irreversibly given [the biological]... with open choices provided [the experiential]... and all this within traditional or emerging cultural and historical patterns" (Erikson, 1970, p. 732).

Erikson saw identity as anchored in the past and aiming for the future, its preservation and renewal depending on each stage of life (Erikson, 1970). Erikson viewed adolescence as its own developmental period as many future developments of the individual depend on this stage. This developmental task requires the individual "to synthesise childhood identifications in such a way that he can both establish a reciprocal relationship with his society and maintain a feeling of continuity within himself" (Marcia, 1966, p. 551). "Identity concepts only emphasise for one stage of life what is true for all, namely that rapid periods of growth and a widening range of cognitions permit, in interaction with living institutions, a renewal of old strengths as well as imitations of new ones" (Erikson, 1970, p. 752). Socially, identity depends on the support that the individual receives from their parents (what is primary) and their community (what is additional) (Erikson, 1970). Support is notably important for Grade ten learners who have to choose between Mathematics and Mathematical Literacy as the choice has far-reaching implications for the future of the individual, framing what s/he can and cannot do and affecting how theindividual's sense of identity develops.

McAdams' life story model of identity extends Erikson and Marcia's ideas and posits that identity takes the form of a story along with its features, like scenes, themes and plots

(McAdams, 2001). The individual incorporates their biographical pasts with their imagined futures within the frame of their historical and cultural contexts to construct a story about themselves so that it makes sense to their 'audience' or whoever it is to whom they tell this story (McAdams, 2001). These stories, or narratives, organise events and experiences of the individual. "The distinctive feature of narratives is that they refer to meaningful and coherent courses of action, with beginnings, middles and ends. This makes their analysis especially significant and appropriate for theory construction in the social science. That is, a central aim of our work is the description and theoretical explanation of social processes, of complex relationships that change through time" (Mischler, 1986, p. 248). Erikson and McAdams' theories on identity both conceptualise it as an integrative process that organises experience in a coherent manner that is meaningful to the individual in terms of situating the self in time, and in relation to the individual's cultural and social context.

Dynamism is an important feature of identity, the ability to adapt and change, to discard parts of the self that are no longer needed and to incorporate new parts (Erikson, 1970; Marcia, 1980). Identity has a 'psychohistorical' quality, as an individual's life story is interwoven with their biographical history and their society, or culture's history. Also important to consider is the fact that individuals base much of their identity on group identities, like religions, nations, and tribes (Erikson, 1970). A developed sense of identity is one where the individual is more aware of their own uniqueness and others' similarity, aware of their strengths and weaknesses, while a less developed sense of identity can be observed where an individual appears more confused about their distinctiveness from others, with a greater reliance on external sources to assess themselves (Marcia, 1980). This gestalt can be thought of in terms of *Bildung*, of development over time (Erikson, 1970) incorporating the individual's ideas about him/her and the ideas of their community/culture into a coherent experience of the self.

Erikson maintains that the strength of the identity structure depends on the support of parental and communal models, with youth particularly depending on the coherence of the ideology of their historical context (1970). The support and strength of their context directly influences how they perceive their context, as strong and flexible enough to contain and support their identity, or weak and inflexible, "suggesting renovation, reformation or revolution" (Erikson, 1970, p. 732).

Narrative identity is fluid yet coherent, based in history and constructed by an individual though their dialogues and interactions with others (Ezzy, 1998).

2.3 Gender, self-government and self-efficacy

Like all developmental milestones, adolescence has its challenges and opportunities. There are questions as to whether adolescent males and females experience different issues of identity. It is argued that the "costs of adolescence" are different for males and females regarding self-esteem, identity and mental health (Eccles, Barber, Jozefowicz, Malenchuk, & Vida, 1999). Carol Gilligan (1990) referred to the process of 'losing one's voice', where adolescent girls lose confidence in their ability to communicate their opinion and needs as they grow older (Eccles, Barber, Jozefowicz, Malenchuk, & Vida, 1999). This change in self-esteem is, however, not universal. Another relevant concept is that of gender role stereotypes, where girls (and boys) tend to have increased positive views of their interests and abilities that conform to stereotypes for their gender (Eccles, Barber, Jozefowicz, Malenchuk, & Vida, 1999). Boys are more likely to report an overestimation of their abilities in the sciences, while girls are more likely to underestimate their abilities in these subjects. Of relevance in this instance, is the view that boys are generally thought of as more suited for Mathematics and scientifically related fields of work, than girls (Hojreebe, 1987; Liu & Tao, 2012; Mendick, 2003; O'Brien, Martinez-pons, & Kopala, 1999). Such discourses undermine girls' educational and vocational aspirations, especially in fields related to mathematics and science. There are many psychological processes related to gendered patterns, such as conceptions of one's personality and capabilities, schema related to the proper roles of men and women, and social aspects regarding proper behaviour in a range of situations (Wigfield, Eccles, Iver, Reuman, & Midgley, 1991). Such social roles are important to consider as discrimination in the past was overtly institutionalised against certain race groups in South Africa, but there also simultaneously existed an implicit form of gender discrimination in common with most societies. "Feminists… argue that in Western societies, many women have been deprived of the narratives, or the texts, plots or examples by which they might assume power over – take control over – their lives" (McAdams, 2001, p. 114).

Research in the USA has shown that a small, but consistent, undermining effect takes place where teachers have low expectations of girls for mathematics and science and on children from lower social class family backgrounds (Eccles, 2004). Young women and learners from poorer

homes are also more subject to positive and negative teacher expectations (Eccles, 2004). Teachers may expect the worst (little effort, poor results) or the best (major effort, high results) from them. Black mothers in South Africa have been shown to have a greater effect on the academic lives of their daughters than on their sons (Thomas, 1996). These mothers tend to expect more from their daughters, investing more time and resources in their education. Parents and their expectations are a great influence to how children interact with their world, in this case, experiencing themselves as efficacious in their academic progress. Parents, as models of behaviour, shape the behaviour of their children. Previous research has indicated that though girls and boys show the same levels of academic achievement in mathematics, each gender describes different attributions. Boys tend to see their achievement as the result of natural ability, while girls see their achievement as a result of effort (Parsons, Adler, & Kaczala, 1982). Academic expectancies vary with age: generally, parents and teachers in the USA have higher educational expectations of boys than girls (Parsons, Adler, & Kaczala, 1982). Parents in the USA tend to stress the importance and difficulty of subjects differently for children of different genders. English and History are stressed for girls as important, while for boys it is mathematics and the sciences (Parsons, Adler, & Kaczala, 1982). This is reflected by the dominance of males in mathematics-related professions, including *teaching* mathematics. Choosing to analyse the narratives of Black adolescent girls in South Africa, and the discourses with which they engage, will provide insight into the effect of implicit social norms located in gender, 'race' and class.

Bandura's social learning theory hypothesises that psychological procedures (such as enactments, decision-making) in all forms serve as "ways of creating and strengthening expectations of personal effectiveness" (Bandura & Adams, 1977, p. 287). Bandura called this 'self-efficacy' and hypothesised that it affected what activities people chose, how much effort they expended, how much they persisted in the face of obstacles, and that the greater the sense of self-efficacy, the greater the occurrence of coping efforts to support achievement in hardship (Bandura & Adams, 1977). Various facets influence perceptions of self-efficacy: performance accomplishments, personal mastery experiences, vicarious experiences, verbal persuasion, states of physical arousal (used as a way to gauge anxiety) (Bandura & Adams, 1977), the similarity to models of behaviour, and the credibility, that is, the legitimacy and believability of the persuader, (Schunk, 1991). Self-efficacy can be said to be enacted within the individual through a sort of "internalised soliloquy" (Athens cited in Ezzy, 1998); an aspect of the internalised self that is in

dialogue with the imagined others of their world, who frame and confer the frame for interpretation of experience. For example, an individual with low self-efficacy for a task may avoid it as they believe they cannot perform the task, or will perform badly, while those who perceive of themselves as efficacious may perform the task readily and willingly, even if they encounter difficulty. The individual will 'speak' to themselves, 'telling' themselves what they can do and what they cannot.

Efficacious individuals are theorised to work hard, and to persevere in the face of difficulties, while those who do not perceive of themselves as efficacious may not, seeing such an effort as futile, expecting failure or little success, and experiencing the self as lacking the necessary skills to adequately complete the task (Schunk, 1991).The development of a coherent, dynamic identity could be said to be dependent on an individual's perception of themselves, and how they believe others perceive them, such as teachers, parents, peers and role models. Parents' expectations, as discussed above, have an influence on children's participation and success in school subjects. Though both genders tend to perform similarly in schools in the US, and spend the same amount of time at exercises and practise, girls report spending more time on this than boys, and emphasise their effort over their ability (Parsons, Adler, & Kaczala, 1982). Parents convey messages to their children regarding beliefs about their academic abilities and the importance of choosing particular subjects. Parents in Parsons, Adler and Kaczala's study rated mathematics as more difficult for their daughters than their sons, though they reported their daughters' general performance in school as better. Attribution research has shown that attributions of success to effort to not contribute to a stable notion of ability as much as *perception of ability* to ability. Attributing success to effort leaves one in doubt of success as demands get higher and work gets more difficult (Frieze, 1978, cited in Parsons, Adler &Kaczala, 1982). Working hard now means that one will have to work even harder later. Combining the lack of importance for mathematics for girls communicated by parents, and the expectation of difficulty with more advanced work, girls are less likely to participate in more advanced mathematics in school. This also closes off many related educational and social benefits, such as study and employment opportunities. This is pertinent in the 'construction' of a learner who does Mathematics or Mathematical Literacy – is the subject 'choice' a function of how efficacious a learner is, or vice versa?

This research project aims to explore identity in black adolescent girls who have had to make the choice between Mathematics and Mathematical Literacy, and the discourses with which they engage in integrating this choice into life stories and constructing their identities.

Chapter 3: Methodology

3.1 Methodological Framework

This project falls in the broad paradigm of qualitative research. A research project sets out to answer questions using a defined set of procedures, collects evidence to answer the question, producing findings that were not predefined in advance (Fossey, Harvey, McDermott, & Davidson, 2002) and this project in particular will utilise qualitative methods. The use of analytic methods posits certain theoretical standpoints, and these need to be elaborated upon. The epistemology for the chosen methods of analysis for this study is located in the constructionist framework, where patterns that are recognised are produced in a social context taking into account the internal life of the individual only insofar as it is seen in speech/text (Braun & Clarke, 2006). According to Braun and Clarke (2006), a phenomenological method reports the experiences, meanings and realities of the individual, while a constructivist method describes how experiences, meanings and realities are a product of an array of discourses in society. Locating themes and discourses in the data is an interpretive methodology. An interpretive methodology focuses on "understanding and accounting for the meaning of human experiences and interactions" (Fossey, Harvey, McDermott, & Davidson, 2002, p. 720). The data elicited were narratives about participants' lives and experiences, their individual realities as understood by them. However, while these are experienced as individual life stories, they are communicated in forms that are culturally understood and sanctioned, using modes of explanation, elaboration and construction that are learnt and patterned.

Each age produces a dominant discourse which moulds what is seen as truth and imposes norms. Foucault (1975) best describes the mechanism of discourse:

> "...throughout the social body, procedures were being elaborated for distributing individuals, fixing them in space, classifying them, extracting from them the maximum in time and forces, training their bodies, coding their continuous behaviour, maintaining them in perfect visibility, forming around them an apparatus of observation, registration and recording, constituting on them a body of knowledge that is accumulated and centralised." (Foucault, 1975, p.219)

Discourse thus determines what is known and what can be known. What is known can only be known in particular ways, that is, in how one learns it, what sort of language one learns to interpret and express meanings. Discourse constrains and enables writing, speaking and thinking within history or context (McHoul & Grace, 1993). Discourses can be said to be concretely enacted in formal institutions, such as schools and the institution of education, and can be located through analysis. A discourse is a theory of how language, for example, is used to "say things, do things and be things" (Gee, 2011, p. 3). Discourse posits that the act, and content, of what is saying follows from doing and being (Gee, 2011). Discourses are thus the "central medium for action, psychology and understanding" (Hepburn & Wiggins, 2007, p. 1). Analysing discourse enables a manner to think about sociocultural contexts and conditions that make the accounts of the individual possible (Braun & Clarke, 2006). Foucault states that "while the human subject is placed in relations of production and signification, he is equally placed in power relations which are very complex" (Foucault, 1982, p. 778). This places an emphasis on how the individual, located in society, internalises *and is made subject to* the prevailing system of power through values, tradition, politics, and so on (Gee, 2011).

One of the earliest discursive practices that we learn is how to tell stories, and to speak about the 'I'. Ricœur (1988) sees narrative as a combination of history and fiction: his argument is that "fiction is quasi-historical and that history is quasi-fictive" (Ezzy, 1998, p. 243). This means that both history and fiction use similar compositional aspects in the act of their telling. Lived experience forms the basis of narratives of self. These events do not possess intrinsic meaning, rather, plots, or manners of organising events into narratives, endow lived experience with meaning over time (Ezzy, 1998). Narratives are creatively constructed, rhetorical phenomena that bear conventions and interpretations, well suited to investigating subjectivity and identity (Reissman, 1993). Speaking about an experience is a construction of the speaker as s/he *wants to be perceived* by the listener, and following conventions familiar to them (or in their 'storytelling' repertoires), the speaker represents her/himself (Goffman, 1959, cited in Reissman, 1993) and displays a point of view about the self (a sort of meta-self). Language and stories play a central role in the process of construction of the self (Crossley, 2002), and narratives are well suited for exhibiting human existence as action situated in time (Polkinghorne, 1995). Narrative is also seen as an organising principle of human action (Sarbin, 1986). The act of telling serves not only

to communicate, but to also promote, perpetuate and iterate a sense of selfhood. It is this sense of 'I' that provides insight into how the individual perceives of her/himself in their world.

Though the individual is the one who conveys his or her message in a narrative of self, the vehicle that conveys the message is not wholly unique. The *langue* is a set of codes that a speaker uses to convey their particular message, and the *parole* is the message itself as it belongs to the individual. In other words, even in telling a personal narrative of self the code belongs to the collective (Ricoeur, 1976). This is the form that their collective (culture, society, family, namely establishments) has taught them, explicitly or implicitly, and has permitted. This is what Ricœur(1976) refers to as the "surplus of meaning" (p.45). It is also what lies 'in front of the text,' that is, the interpretation that a reader/listener/audience makes of what the writer/speaker puts forward as text, communicated in a code where the thoughts, ideas and feelings sanctioned by culture are ubiquitous, or discourse (Ricoeur, 1976). Culture provides the individual with the tools for talking about their identity, even for constructing the identity itself (Manchion & Van Leeuwen, 2008). Narratives that humans tell about themselves might seem natural and effortless, but the terms used can be analysed for cultural and historical contingency (Reissman, 1993). Based on the narratives individuals produce and the discourses they utilise to produce them, it is possible to explore how an individual, through their stories, is enabled, inhibited or fostered by society, what forms of oppression go unquestioned, and how and why some things are valued over others. This study investigates the discourses with which people engage when they talk about their experiences with mathematics and being in mathematics classes, and also being adolescents needing to make decisions with adult implications.

Discursive psychology regards talk as action oriented in the sense that what is said is constructed in ways that perform the actions they are telling (Edwards, 2005). Actions are seen as portrayed through speech. Largely developed to analyse interview data, discursive psychology uses methods of discourse analysis and conversation analysis to analyse what actions respondents perform through speech (Edwards, 2005). Discursive psychology works with the perspectives displayed by participants in interactions, how these are embodied in their standpoints and how these are conveyed (Hepburn & Wiggins, 2007). Though discourse is generally thought to be a uniform enactment, it is an enactment that is mediated through the idiosyncrasies and personal contexts, the discursive, of the acting individual.

The research questions of this study aim to locate and describe identities established, conveyed, learned, and made salient by differences in subject choices at school. This particular moment in the life of a child in the South African education system can establish a very particular pathway, some providing more (and wider) opportunities than others. Through eliciting narratives, stories from learners about themselves and their lives, an analysis of value, importance and power (implicit and explicit) can be conducted.

3.2 Research Sites and Participants

Ethics clearance from the School of Human and Community Development was received before data collection commenced (see Appendix 1).While clearance from the Gauteng Department of Education was being sought (see Appendix 2) both schools were preliminarily approached for permission to collect data for the project. A letter to the principal, explaining the research project and the process of data collection was provided to the vice principals (see Appendix 3).Vice principals agreed on behalf of the principals, and once clearance was obtained from the Gauteng Department of Education, active data collection commenced.

Two schools were approached, both located in the greater Johannesburg area, and each are provided pseudonyms. Nedi High is a non-fee paying school in Soweto. Teachers at the school do not have fixed class rooms; rather their 'home base' is the staffroom where each teacher has a desk and storage space. When classes change, the learners remain in the same class, which designates their grade and stream (Science, Business, General) and the teachers come to them.

The school is not very well resourced and the learners had to share desks in some cases. The grade 8 class rooms had no desks in them at all. It was explained that this was because the matric trial exams were taking place and the desks were required there. Teacher presence at the school was not very extensive, though only a few teachers were invigilating at any given time. Learners walked around freely, at points only going back to their class room when a teacher came to teach. The school has an extensive feeding scheme, providing meals to many of the learners, who also helped to prepare the meals and clean up afterwards.

There are 315 grade ten learners divided into five classes. Two of these classes take Mathematics, while the other three classes are Mathematical Literacy classes. Subjects in the school are offered in structured packages. The Mathematics learners take Physical Sciences,

along with other subjects like Accounting, Life Sciences (biology) and Geography. None of the Mathematical Literacy classes take Physical Sciences, and none of the Mathematics classes take History. Learners are taught subjects in English, and multiple second languages are taught at the school: Xitsonga, Tshivenda, IsiZulu and Sesotho. Afrikaans is not taught at the school. Three of the five Grade 10 classes were available to fill in the demographic questionnaires, one Mathematics and two Mathematical Literacy.

Simon High is a fee-paying school in Lenasia. The school is larger than Nedi High. Some classes are full, with the desks coming up almost to the front of the class, while others do not have as many learners. Teachers have fixed classes, and it is the learners who move to different classes when periods change. However at the time of the study, there was little movement as it was during the matric trial examinations. Learners were given work for revision, and those who were without a teacher (absent or invigilating) were checked on occasionally by a neighbouring teacher. The school has some measure of resources, including computer facilities, and a new library opened in a ceremony involving a provincial funding authority. Teacher presence at the school was quite high, and was supported by community volunteers who assist with curbing truancy, and, anecdotally, monitoring the children as there had recently been some violence among learners. The school has a feeding scheme, but it did not appear to serve a large proportion of the learner population.

Simon High has 436 Grade ten learners divided into 11 classes. Only two of these classes take Mathematics, with the rest taking Mathematical Literacy. Simon High has more grade ten learners, and a larger student body in general, than Nedi High. Like Nedi High, subjects are offered in structured packages, with the Mathematics classes taking Physical Sciences and Computer Applications Technology. Subjects are taught in English, and the only second language available at the school is Afrikaans. Seven of the 11 Grade ten classes were available to complete the questionnaires, two Mathematics and seven Mathematical Literacy.

The summary of the number of learners and classes in the two schools is presented in Table one below:

School	Nedi High	Simon High
Total grade 10 learners	315	436
Mathematics classes	2	2
Mathematical Literacy classes	3	9
Quintile	3	4

Table 1: Summary information of number of learners for survey

The sample of interview volunteers consisted of eleven girls in Grade 10. Six girls were from Nedi High, with an even split among the Mathematics and Mathematical Literacy classes. The remaining five girls were from Simon High, with three girls in Mathematics classes and two in Mathematical Literacy classes. The sample was purposive, meaning that particular individuals were approached as appropriate sources of information (Fossey, Harvey, McDermott, & Davidson, 2002) to for the purposes of answering the research questions. The aim was to gather as much information as was relevant and useful. Interviews were used as a method to gather information from the participants. Participants were assigned pseudonyms and the profile of participants across the two schools, and the Mathematics and Mathematical Literacy classes, is shown in table 2 below:

Mathematics	Mathematical Literacy	School
Ntombi	Ontiretse	Simon High
Basetsana	Dipuo	Simon High
Maryle	(No third participant)	Simon High
Ruth	Norma	Nedi High
Reneilwe	Sindile	Nedi High
Katlego	Bulelwa	Nedi High

Table 2: Individual interview participants

3.3 Data collection

The data collection process occurred in two phases. In Phase 1, data were collected in the form of demographic questionnaires (see Appendix 4)which were to be filled out by the entire grade 10 student body of each school. The demographic questionnaires served to compile a profile of the learners and the teaching and learning of Mathematics and Mathematical Literacy, accompanied by first-hand, on-site observations. The data gathered in this stage served to provide an overall picture of the grade ten learners, while Phase two provides greater and more

focused depth. In Phase 2, individual interviews were conducted with volunteer participants from the same schools. Semi-structured interviews took place individually with each of the participants.

Initially, information about the timetables was requested from the vice principals, but it was suggested by teachers in both schools that classes be approached individually, and in the event of a free period or with permission from the teacher, data collection could commence. When a class was approached, the study was briefly explained to them, and they were asked to complete the questionnaire. The language of the questionnaires was believed to be appropriate for grade 10 learners, but after encountering difficulties at Nedi High in initially using the questionnaire, I decided to facilitate the completion of the questionnaire by assisting the groups. Each question was read through one at a time, giving learners a chance to complete each question, and also to answer their questions in plenary or individually as was necessary.

After the questionnaires were completed and collected, learners were told about the second phase of the study, and were then asked if they would like to participate in the individual interviews. The learners who volunteered were given information letters and consent and assent forms (see Appendices 5, 6, 7 & 8). They were also asked to provide contact details where they and their parent/s or guardian/s could be contacted to confirm their consent. Once permission and the signed forms were obtained, interviews were arranged on the school premises when the learners had free periods. Free periods were used because at this time, matriculants in both schools were writing preliminary examinations, and at times, teachers were required to invigilate. In these periods learners were revising, and it was recommended that this time be used for the interviews.

Data were collected in the form of semi-structured interviews in Phase 2 (see Appendix 9). Interviews are descriptions of experience as reported by the participant through the prompts of questions (Fossey, Harvey, McDermott, & Davidson, 2002). Typically, interviews are approached neutrally, attempting to erase as much of the influence of the interviewer as possible. However, interviews are interactions (Holstein & Gubrium, 2004), and they involve all parties who participate, whether they ask the questions or answer them. “All participants in an interview are implicated in making meaning” (Holstein & Gubrium, 2004, p. 157). Together, the participant and the researcher produce the content. Interviews were video recorded to allow for relevant non-verbal aspects of the interview to be recorded, freeing the interviewer, who would

otherwise have to make extensive notes during the process of the interview, which could potentially negatively affect the interview. Only female learners were invited to be interview participants as this research project focused on adolescent girls.

For the interviews, the principal at Nedi High provided an unoccupied classroom (due to the preliminary examinations) on the first day of interviews, and on other occasions offered the use of a room that was used by the school to house books and other miscellaneous items, along with space for a student teacher. At Simon High, an unoccupied classroom was provided for all the interviews. On the day of the interview, each learner furnished the signed consent and assent forms before the interview could commence.

Interviews were video recorded, and in one instance, where there was extensive background noise, a cell phone was used as a secondary voice recording device as the participant was very soft spoken. Learners were asked to draw a mental map, which was used as a means to begin discussion by prompting the learners to talk about people and places that were important to them. Bray et al (2010) used mental maps in their work with learners to allow them to 'show and tell' stories about their neighbourhoods and schools.While Bray et al used the mental maps as an additional aspect to their data and analysis, this study used them to allow the learner to frame their narratives. They were discussed as a means to pose the questions from the interview schedule. Participants were provided with refreshments.

3.4 Data Analysis

"Description is part of the analytic journey" (Bazeley, 2009, p. 8).

Thematic analysis was performed on the data as a foundation for organisation and description of the data (Braun & Clarke, 2006). Thematic analysis described the data's 'matter', and discourse analysis indicated aspects of socially constructed systems of value and ways of being that are not explicitly pursued, but implicitly guide and direct human behaviour within society.

Thematic content analysis was conducted on the Phase 1 demographic questionnaire data. An ordering of the data was conducted, providing frequencies and patterns to the responses of grade 10 learners in both schools. The responses from the open ended questions were arranged into themes, organising and analysing the range of responses received. This allowed a comparison among Mathematics and Mathematical Literacy learners, and also across the two schools.

The Phase 2 video-recorded interviews were transcribed using an adaptation of notation developed by Gail Jefferson in order to capture as much of what was occurring non-verbally in the interview as was possible, and relevant to analysis (Jefferson, 2004). The symbols used in the transcript excerpts are presented in table three:

Symbol	Function	Symbol	Function
hh	Outbreath	° °	Words spoken softly
.hh	Inbreath	((*x*))	Description of tone, gesture
_____	(underline) stress; emphasis	↑↓	High/low pitch
><	Speeded-up speech	,.?!	Usual intonation
(word)	Unclear speech	=	No pause, break; run-on line
:	Previous sound prolonged	[	Overlapping speech

Table 3 Transcription symbols utilised in transcriptions

These symbols allow for representation and analysis of not only the spoken word, but also *how* it is expressed. Two of the six participants from Nedi High elected to speak in English, while the others spoke either Zulu or Sotho, and all participants from Simon High spoke in English. Extracts from the interviews that were not in English are presented in translation in the analysis, as analysing the data in the language of origin would have exceeded the bounds of this research report. The data in the original language are appended (see Appendix 10), and are accompanied by an English translation conducted by the researcher. Notes are provided where needed to elaborate on the translation.

Thematic analysis was performed on the interview data.Arranging the data into themes serves to arrange and display ideas and patterns that stand out and are important to the researcher in service of their research questions. As Boyatzis argues:

> "Thematic analysis is a way of seeing. Often, what one sees through thematic analysis does not appear to others, even if they are observing the same information, events, or situations. To others, if they agree with the insight, the insight appears almost magical. If they are empowered by the insight, it appears visionary. If they disagree with the insight, it appears delusionary. Observation precedes understanding. Recognising an important

> moment (seeing) precedes encoding it (seeing it as something), which in turn preceded interpretation. Thematic analysis moves you through these three phases of inquiry."
>
> (Boyatzis, 1998, p. 1)

In line with Boyatzis' description, the themes that a researcher assigns to the data are framed by the researcher's aims and theoretical alliances. This is largely a process of interpreting the data that is guided by previous experience, knowledge and intentions regarding the project as a whole. Interview data were studied and coded. A code is a 'label' that identifies a feature of the data and can be assessed meaningfully, in relation to the occurrence (Braun & Clarke, 2006). Codes were organised into families or themes, which organise and describe the data (Boyatzis, 1998; Braun & Clarke, 2006).

Discourse analysis was part of the analytic process, which involved utilising the themes assigned to the data to construct an understanding of the prevailing context within which the individual acknowledges their being. This aspect of analysis served to unpack how individuals situate themselves in the society they are in, how they perpetuate its norms, and how they regulate its interdictions within (internally) and without themselves. Society regulates and maintains its stability through ascribing the kinds of identities one can conceive of (Lemke, 2008), and provides tools for identity. Discourse analysis allows the researcher to describe aspects of life, here identity, as it is known and expressed by the grade 10 learners, who perpetuate it in forms of expression that are familiar to them, and form part of their repertoires. Similarly, discourse analysis allows for questioning of norms and standards in sites of inequality, tradition, and values.

Thematic and discourse analysis are used "to break open" (Bazeley, 2009, p. 9) the data and to say what it is that is meant and use it as a means to understand the effect of the 'I', society and 'I'-in-society as can be seen subject choices. Finding these themes and discourses is not a passive activity but one that requires interaction and reflection with the data. Strauss and Corbin (1990, cited in (Boyatzis, 1998) described 'theoretical sensitivity' as the ability of researchers to identify from the data what is important, what it means and to locate these observations and the relevant concepts in use. Boyatzis(1998) further describes cognitive complexity as "perceiving multiple causality and multiple variables over time and other variations, as well as the ability to

conceptualise a system of relationships" (Boyatzis, 1998, p. 8). Theoretical sensitivity and cognitive complexity are the foundations of interpretation. This data-driven approach allows for themes to be organised to allow for the convergence of the data and the research question, and for the discourses to be elaborated and substantiated with evidence from the data. Overall, the data analysis will present extended illustrative examples of text and offers a discursive analysis of both talk and non-verbal cues. Specific extracts from the interviews will be used to illustrate each key theme.

3.5 Ethical Considerations

As this project involved direct interaction with minors in school, permission was required to be on school premises from both the Department of Basic Education and the principals of the respective schools. Permission was also required from the parents or guardians of the interview participants, and this was obtained through the consent forms (see Appendix 6). The learners also had to sign an assent form, agreeing to be participants (see Appendix 7).

Though it was emphasised to learners that participation was voluntary, at times it was difficult to enact this aim fully due to the presence of teachers and the context of the school. Teachers were present during the first phase of data collection, the demographic questionnaire, and learners were worried that teachers would read their responses. It was emphasised that there was no identifying information required, that no names should be written on the questionnaires, and that only the researcher would have direct access to the data.

For phase 2, it was ensured that the parents or guardians of the learners had given consent, and that the learners themselves gave assent. Two learners were recommended by a teacher. It was emphasised to them that the interviews were completely voluntary, and that their decision to not participate would not affect them negatively in any way, and they were given time to consider. They assented, and after parental consent was obtained and confirmed, the interviews were conducted. The interviews were video-recorded, which cannot guarantee that the participant will not be recognised should the footage be used in educational settings, for example. This may have been one of the reasons that some parents refused to provide consent for their children's participation.

An important ethical dilemma occurred during data collection, which may or may not compromise matters of confidentiality. One of the learners, during her interview, spoke about having dark thoughts and thinking about suicide. Though she only stated this briefly, it was concerning. I decided, after the interview, to speak to her teacher, emphasising that though the interview context was confidential, it was necessary to find a way to determine if there was a problem. The teacher stated that she was aware that the learner had had some issues at home (which I had known from the interview, but did not state to the teacher). The teacher arranged a meeting with the study group that the learner belonged to, which was not out of place in the running of the group, to discuss dealing with such issues as emotional problems, coping strategies, and forming support systems. I was not present at this meeting as Department of Basic Education clearance had expired by the time of the meeting, but I was assured that the learner's issues would not be singled out, nor would the fact that I had brought this to the attention of the teacher be made knowledge. In a follow-up visit to the teacher, she described how after the interview, the learner was more open, talked to her about issues, and had engaged in more group activities, becoming closer with her friends.

Chapter 4: Discussion of results – Phase 1

4.1 School and Mathematics/Mathematical Literacy class profiles

Data from the questionnaires was analysed through thematic content analysis. The frequencies provided are of the grade ten population at both schools, with details on the survey sample. Table four details the profile of the learners who were surveyed in both schools. Over half of the learners were reached at Simon High, while over a third (37.7%) of learners were reached at Nedi High. All Mathematics classes were surveyed, while not all the Mathematical Literacy classes were reached in both schools.

	Nedi High (n)	**%**	**Simon High (n)**	**%**	**Total**
Surveyed	119	37.7% of gr.10 class	237	54.3% of gr.10 class	**356**
Mathematics classes	**37**	**31%**	**67**	**28%**	104
Males	16	43	31	46	47
Females	21	57	36	54	57
Mathematical Literacy classes	**82**	**69%**	**170**	**72%**	252
Males	41	50	75	44	116
Females	41	50	95	56	136

Table 4: Learners surveyed from Mathematics and Mathematical Literacy Classes in Nedi High and Simon High

It is important to note that unlike in the Mathematical Literacy classes, females consistently outnumbered males in the Mathematics classes across both schools. This contrasts with Parsons, Adler and Kaczala's(1982) findings that American parents' expectations of their sons' academic attainment exceeded that of their daughters, with mathematics being seen as more important for boys than for girls. With their findings, one would expect more boys than girls in the Mathematics class, but it is not so here. Though the difference is minimal, it is important to note. The slightly higher number of girls in Mathematics classes may indicate that girls choose the more difficult Mathematics, whether they attribute their success to effort or ability (Parsons, Adler & Kaczala, 1982). This may also show a change in how parents relate to the subjects that their children take at school and a shift in gendered views, to more gender-neutral views of appropriate careers for girls.

Analysing parental occupation indicated the varied situations that learners live in at home. They were classified under the following categories: Occupations classified under 'Professional' are

occupations where individuals have to obtain qualifications, such as teachers, nurses, lawyers, and doctors. The (semi) skilled category included occupations that require some skills to be learned by the individual. These included mechanics, truck drivers, child minders, plumbers and electricians. Those occupations classified under unskilled included labourers, domestic workers and gardeners. The self-employed were categorised as such as they owned businesses, such as a sweet shop and an internet cafe, and some parents don't own businesses but are self-employed, such as an Avon representative and a Tupperware agent. Many learners did not know their parents' occupations. They provided responses such as 'working', 'works at government' or provided the names of the places where their parents work, such as 'ABSA', 'Rand Water', and 'Sports and Recreation'. A few learners stated that they did not live with their parents, or that their parents were unemployed. Some learners had parents who were deceased. Some learners left these fields blank. Table five summarises these data by section, and table six provides further detail.

Section	Number	%
Employed Parents	244	34.3%
Parents who do not work or live with their children	284	39.9%
Blank responses	184	25.8%
Total	712	100

Table 5:Summary of Parents' data

The grade ten cohort was surveyed in both schools, which provided data on their parents' occupations. The 356 learners provided responses for both of their parents' occupations. The total parents from the number of surveys completed is 712 (two parents for each learner surveyed). The table is divided into 3 sections: Section A details the employed parents and the nature of their occupation. Section B details the unemployed parents, including those who the learners stated did not live with them, and those who the learners stated that they didn't know what their parents did for a living. This section also includes deceased parents. Section C is the number of blank responses in the survey.

Subject & school	Maths – Simon High	Maths – Nedi High	ML – Simon High	ML – Nedi High	Total (% pop.)
(Semi) skilled	19	9	60	7	95
%	**7.8%**	**3.4%**	**24.6%**	**2.9%**	**38.9%**
Professional	33	7	37	4	81
%	**13.5%**	**2.9%**	**15.2%**	**1.6%**	**33.2%**
Self-employed	8	3	20	7	38
%	**3.3%**	**1.2%**	**8.2%**	**2.9%**	**15.6%**
Unskilled	8	7	9	6	30
%	**3.3%**	**2.9%**	**3.4%**	**2.5%**	**12.3%**
Total (n)	**68**	**26**	**126**	**24**	**244**

Table 6: Employed Parents

Table six details the occupations of the parents who were reported as employed.The greatest proportion of employed parents were in (semi-) skilled occupations, at 38.9%. Most of these are parents of the Mathematical Literacy learners at Simon High, at 24.6%. There were 33.2% of parents employed in a profession. A majority of these parents had children in the fee-paying school, Simon High. 13.5% had children in the Mathematics class, and 15.2% in Mathematical Literacy. One might believe that parents would want opportunities for their children that they did not have, so one would expect more learners in the Mathematics class, but it is not so in this sample. By encouraging opportunities that would increase future gain, parents can steer their children away from their historical and contextual circumstances. Inferior education received by parents (if at all) under the Apartheid system fixes the parents in a loop of unemployment and brief, low-paying employment (Bray, Gooskens, Kahn, Moses & Seekings, 2010).15.6% of parents were self-employed. A majority of these have children in the Mathematical Literacy class at Simon High. The lowest proportion was for parents with unskilled occupations (12.3%). These were approximately evenly spread across schools and classes. All the employed parents encompassed 34.3% of the surveyed group.

Subject & school	Maths – Simon High	Maths – Nedi High	ML – Simon High	ML – Nedi High	Total (% pop.)
Don't know/ don't live with them	18	25	66	53	162
%	**6.3%**	**8.8%**	**23.3%**	**18.7%**	**57%**
Unemployed	17	14	31	23	85
%	**5.9%**	**4.9%**	**10.9%**	**7.7%**	**29.9%**
Deceased	8	6	3	20	37
%	**2.8%**	**2.1**	**1.1%**	**7%**	**13%**
Total (n)	**43**	**45**	**100**	**96**	**284**

Table 7: Parents who do not work or live with their children

Table seven shows that over half of the parents either did not live with their children, or their children did not know what their parents' occupation was (57%). 29.9% of parents were described as unemployed by the learners. 13% of the parents were deceased.

Subject & school	Maths – Simon High	Maths – Nedi High	ML – Simon High	ML – Nedi High	Total
Blank	23	3	114	44	184

Table 8: Blank responses

The data in section B made up 39.9% of the parents' data. Table eight describes all the blank responses in the surveys. These responses comprised 25.8% of the data.

4.2 Reasons for choosing Mathematics

The reasons that learners offered for choosing Mathematics were careers, variation of opportunities, tertiary study, enjoyment, subject grouping, social status and an ability to choose. The frequencies of themes as per the data are shown in the following table:

School	Careers	Tertiary study	Opportunities	Enjoyment of subject	Social status	Ability to choose	Subject grouping
Nedi High	18	-	6	11	-	-	5
Simon High	10	22	14	2	3	7	5
Total	28	22	20	14	3	7	10

Table 9: Themes from Mathematics learners –frequency of reasons for subject choice

It is clear from table 7 that the majority of learners reported that their reasons for taking Mathematics involved their career choices. They chose the subject as it was a requirement.

> *Because the job I want when I finish school has to do with maths (Nedi High, F[5])*
> *Because it goes along with my career course and they don't want maths lit (Simon High, F)*
> *Because I want to persue (sic) my dream to become a pilot or a nurse (Nedi High, F)*
> *Because I want to be a good doctor (Nedi High, F)*
> *Because I want to become a mathematics teacher and I need it (Simon High, F)*

These learners indicate that they have put effort into exploring their career aims and display some understanding of the requirements of their intended careers, and have taken Mathematics to meet these requirements. These learners seem to know that Mathematical Literacy is not adequate for their aims. The Department of Basic Education's curriculum statements for Mathematical Literacy describe the subject as enabling "the learner to become a self-managing person, a contributing worker and a participating citizen" (DoBE, 2011a, p.8). The curriculum statement for Mathematics, on the other hand, describes the subject as enabling learners to "participate as responsible citizens in the life of local, national and global communities" (DoBE, 2011b, p.8). The Mathematics learner is equipped with more knowledge and skills, and the subject confers knowledge that is applicable outside their own context, enabling particular work and links to the global economy. A greater and wider scope of possibility exists for these learners, particularly in terms of careers.

[5]F = Female learner. M = Male learner.

Mathematics here serves as a necessary step towards the future. However some of the learners' responses indicate that their ostensible clarity about the purposes of mathematics and its links to career opportunities is very superficial and may simply be a recitation of information given by teachers. For example, one of the girls said she wants to be 'a pilot or a nurse.' Though both of these are professions, they are quite different from one another; one is a highly technical, high pressure, sometimes dangerous and characteristically male, while the other is a caring profession in the medical field that is characteristically female. The idea that a girl can consider both in the same expression, as equal by indicating that either professionis a viable choice, shows how Mathematics is seen as a means to open opportunity rendering many things equal and accessible. Mathematics is 'capital' as it affords these learners access to opportunities that those who don't do Mathematics are denied (Bourdieu, 1986). Another learner states that she wants to be "*a good doctor*." This communicates assumptions around common knowledge of the importance and utility (capital) of Mathematics, that thrive and are reinforced in such expressions. The utility of Mathematics is concretely emphasised in explicit statements, where Mathematics is expressly necessary, and Mathematical Literacy is viewed as inadequate.

> *I chose maths because of the course I wanted to do in university (Simon High, F)*
> *Because the course I want to do in tertiary requires it (Simon High, M)*
> *Because I want to study geo-hydrological technician course when I finish school (Simon High, M)*
> *I want to go to university and study and also get a better life (Simon High, F)*

These learners believe that Mathematics is a requirement for tertiary study. They have attached to Mathematics the same perceptions they have about tertiary study and career orientation, that it will improve their lives. A specialist career may offer an opportunity to better economic means, and as these chosen trajectories require Mathematics, the subject itself is imbued with the same properties. They are aware that the 'capital' conveyed through Mathematics can be conveyed to economic gain (Bourdieu, 1986). By linking perceptions of value to Mathematics *and* to tertiary study, learners form a type of 'success algorithm', where the next step requires a successful previous step. Learners reported that the Mathematics subject has more opportunities for any future prospects.

> *To have better opportunities and options after high school (Simon High, F)*
> *Because I can get a job easy (Nedi High, F)*

It features different kinds of works (Nedi High, M)
I choose it because with mathematics you can achieve anything when you finish school (Simon High, F)
Because I lyke(sic) solving and it has more opportunity than maths lit (Nedi High, M)
Its enjoyable, it opens more job opportunities and I was guided by my mother into doing it (Simon High, M)

By stating that they believe that Mathematics has the 'ability' to open up doors, learners are indicating that they perceive Mathematics and the skills it confers as being highly adaptable and valuable in realms outside of and beyond secondary schooling (Bourdieu, 1986). The fact that they think they can "get a job easy" expresses a notion that without Mathematics getting a job would be harder, and that those who do not do Mathematics will, in turn, find it harder to get a job. This property of being able to 'open doors' allows for a measure of choice beyond the realm of high school, affording the learner *more* in terms of higher quality choices (Bourdieu, 1986). It is interesting to note that one learner has described it as allowing one to "*achieve anything,*" conferring an almost magical property on Mathematics that is only accessible to a select few. It is an exclusive form of capital, and thus it is very limited (Bourdieu, 1986). This is also emphasised by parents' choices and influence, like the mother above who 'guides' her child to the subject thus appropriating importance to it through their authority over their children. This may be despite parents not having had access to Mathematics or the career paths it offers, for themselves. Mathematics confers a range of opportunities and also variation of choice, particularly in comparison to Mathematical Literacy which limits options post-school.

Some learners said that they chose the subject as it was something they "understood and liked."

Because it's very easy to me and I like it (Nedi High, F)
Because I have been wanting to know it very well (Nedi High, F)
Because I understand it (Nedi High, M)
Because I enjoy it (Simon High, M)
I'm good at it and I like mathematics (Simon High, M)

Learners who cited this as a reason communicate a perceived aptitude and a positive assessment of themselves and their ability (Bandura & Adams, 1977). It is important to emphasise the

application to the self of the perception, that it is not the subject that it easy, but that it is *easy to them*. This signifies that perhaps the subject (or the perception of it) is difficult, or that others may find it so, but the statements made here apply to the speakers particularly. They see themselves as efficacious and capable (Bandura & Adams, 1977). They are linking difficulty and challenge with enjoyment through ease. While this serves to describe the self as highly capable, it frames the other as the opposite, as one who is not as capable and who shies away from a challenge, framing Mathematical Literacy learners as inadequate. The fact that learners have to 'qualify' to take Mathematics from their mathematics performance from Grade 8 and 9 adds a component of continuous achievement on the part of the Mathematics learner. There is also an expression of desire to deepen their understanding as it stands, to be more familiar with and knowledgeable in the subject content. This is an expression of confidence in their intellectual ability and a capacity to learn more. Both of these facets express a proficiency with content that is difficult, communicating that the speakers perceive themselves as adept, high performers, recognising that others might not be. Identity development and coherence depend on the support the individual receives from influential figures (parents, teachers) and their community (school, peers) (Erikson, 1970). Schooling, as an institution with its apparatus of assessment, grading and differential access (Beuscart & Peerbayer, 2006), moulds and certifies the individualaccording to its rules and requirements. These learners succeed at Mathematics, and their consistent achievement refines their skills. Their love of the subject is supported by their success. The conjoining of enjoyment of and success in the subject increases pleasure and entrenches beliefs held about the subject and themselves.

Only learners in Simon High, the fee paying school, expressly stated that the status conferred on the learner taking Mathematics is recognised, offering social value with their adolescent world of hierarchical relationships.

> *To brag to my friends about it cause they do maths lite (F)*
> *To brag to my friends or to let them know that I am clever (F)*
> *Because I wanted to do accounting and because I wanted to brag about doing Pure Maths (F)*

These learners, through their reasons, establish a dichotomy between themselves and their counterparts in the Mathematical Literacy classes, which is dismissively referred to as "*maths lite*". The subject is seen as a weaker, diluted version of Mathematics to render it more accessible

to those who are not as mathematically ‘strong’ as themselves. It also conveys a pejorative tone towards Mathematical Literacy learners, as they are the ones who cannot ‘handle’ the harder subject. There is also an emphasis on the intelligence of the Mathematics learner in comparison to the Mathematical Literacy learner. The ‘bragging’ serves to let others know that one is “*clever.*” The assumption is that the Mathematical Literacy learner, or even also the subject itself, is not clever at all, not even requiring a degree of comparison.

The competitive schooling context, iterated by needing to qualify to do Mathematics, situates learners in opposition. They either do Mathematics or Mathematical Literacy. The fact that the learners *can* brag shows the context that *must* exist for these learners to be able to model this behaviour(Wortham, 2008). People cannot engage in events or positions that do not exist in their context, therefore these learners are only able to boast about Mathematics as it is considered desirable, preferable and indicative higher academic status on even individual intelligence.

It is important to note that these learners perceive themselves as having the option to choose. They have the necessary requirements to take Mathematics, and thus they can also hypothetically choose to *not* to choose Mathematics.

> *My decision (M)*
> *Because I can (M)*
> *Just to try what’s happening (M)*

This right is exclusive to Mathematics learners as learners in both schools could only take Mathematics if their performance in previous grades was adequate. This choice is not individual or detached from the prevailing economic, political and historical context (Apple, 2004). These adolescents are at a stage in their lives where the choicesthey (can) make will bear marked influence on their adult lives. Their sense of selfhood is expanded (or minimised) as their perception of adulthood emerges (Arnett, 2000 cited in McAdams, 2001). They feel that they have earned the right to make such decisions on the basis of merit. The necessity of making such a far-reaching decision reinforces their self-perceptions as a being more mature and capable than other children. They are (perceiving themselves as) growing up.

Only learners in the fee-paying school Simon High provided these reasons. This may reflect some feature of their environment or academic culture that openly acknowledges competition

and stratified orders of achievement. The assertion of agency by these learners from Simon High also expands on the idea of the individual in the group: "The phenomenological experience of unique selfhood overflows social semiotic categories, both structural and agentive, as we create feeling as well as meaning for ourselves and others across multiple timescales in our lives" (Lemke, 2008, p. 18). Our cultures create situations where we are able to make decisions, insofar as they are possible within existing and possible models. The process of being able to make the choice provides the individual with a means to simultaneously assert his/her separateness and engage in a process of expounding what is normal and acceptable in the respective culture.

There were a few learners (five from each school) who stated that the only reason they do Mathematics is due to circumstance, particularly due to the structured subject packages.

> *Because the subject that I choose, goes along with Maths and I am not good at Mathematics (Nedi High, F)*
> *Because it is combined with subjects that I enjoy (Simon High, F)*
> *The other subjects going with it I love them (Business studies, Accounting and economics) (Simon High, F)*
> *Because the course we chose only goes with mathematical and not math lit (Simon High, F)*

For these cases, Mathematics is not the subject they would choose if they had the choice. The learners do not see themselves as capable Mathematics learners, and are intimidated by the difficulty of the subject: "I am not good at Mathematics." Mathematics for these learners is an ordeal to be borne. It is interesting to note that their lack of skill is stated as a fact and not an opinion or perception, and conveys a sense that it is incontrovertible. The subject itself is neither chosen nor enjoyed. One learner states that it is the other subjects that are enjoyed, not Mathematics, similar to another: "*I love them*" but not Mathematics. With subjects being offered in 'packages', learners who cannot get to do the exact subjects they want must take the 'least offensive' route. For this minority, taking Mathematics is an unintentional corollary to their choice of other subjects.

The reasons provided by Mathematics learners focused on future plans, belief in skill and ability and positioning the self as agent. "Identities are enacted or performed" (Butler, 1993 in Lemke, 2008, p.17) and these individuals are performing as agentic, intelligent beings who are able to

make choices about their futures. They earned this right through their achievements in mathematics in preceding years – these learners are not only told, but *shown*, through tests and reports, that they are Mathematics learners. Developing and maintaining identity is, in part, a material process, therefore the results of the grading and assessment process allows the learner to conceive themselves as equipped for Mathematics and its capacity to allow individuals to make choices that others are denied.

4.3 Reasons for choosing Mathematical Literacy

The ostensible individual choice reasons provided by learners for taking Mathematical Literacy included: the subject being easy and accessible, liking and understanding the subject, lack of skill in Mathematics, subject groupings, tangential reasons, being unable to qualify for Mathematics and Mathematical Literacy as being suitable for their future plans. The frequencies of themes, as extracted from the data, are shown in the following table.

School	"Easy" – enjoyment & understanding	Lack of skill	Cannot qualify	Subject grouping	Reasons unrelated to maths	Future	No reason given
Nedi High	63	4	2	5	4	2	2
Simon High	64	28	56	6	-	10	6
Total	127	32	58	11	4	12	8

Table 10: Themes from Mathematical Literacy learners - Frequency of reasons for subject choice

With the majority of learners, Mathematical Literacy was described as an easy subject and one that is accessible.

> *Because I think that its easy for me (Nedi High, M)*
> *Because its simple (Nedi High, M)*
> *Because it is the easy subject and when we talk about the thing we do everyday (Nedi High, M)*
> *Because I don't understand mathematics but maths literacy I know (Nedi High, F)*
> *Because it is easy than pure maths I actually can cope with it (Simon High, F)*
> *Because it is more easy and I understand it fast than doing mathematics (Simon High, F)*
> *Because I am not good in maths so I decided to go the easy way (Simon High, F)*
> *To boost on my maths marks (Simon High, M)*

Mathematical Literacy is perceived as simple and approachable, a subject that develops skills that can be used in everyday settings. There was a marked occurrence of learners describing the ease of the subject in self-referential terms: it is easy *"for me."* They are not speaking for anyone else's experience, but they are accounting for their own. Mathematical Literacy feels relevant, as the work they cover deals with everyday subject matter. The Department of Education's Mathematical Literacy Curriculum statements emphasises the subject as integral for active citizenship (2011) and these learners seem to affirm this in their experience of the subject as relevant for everyday life. One cannot participate in day-to-day activities of one's fellow citizens without some number sense. Ojose (2011) describes minimum mathematical knowledge for citizens as conditions for citizenship: a citizen "should know" or "be familiar with" basic mathematical concepts such as arithmetic, dimension, basic statistical knowledge and probability, among others (p. 97). Setting out conditions for participation and making Mathematical Literacy the default position for those who do not do Mathematics imposes on them the identity of the commoner, the proletariat, the ordinary person. By dealing with concrete examples, the mathematical content is rendered relatable and applicable for the Mathematical Literacy learner. By comparison, the highly abstract and conceptual quality of Mathematics may leave learners feeling that the content is inaccessible and is not useful in an immediate sense (Venkat & Graven, 2008). Mathematical Literacy is the subject whose aims and teachings can be easily understood and readily applied, therefore it appears more useful. The difference between 'knowing' and 'understanding' here is the difference between Mathematics and Mathematical Literacy. Mathematics requires understanding, that is, an engagement with the material beyond the superficial level, where components are grasped and comprehended. These learners do not feel that they have this capacity for Mathematical understanding, but for Mathematical Literacy, *to know* is enough.

Mathematics is framed by non-Mathematics learners as difficult, and Mathematical Literacy is the easier option of the two subjects for them. Performance outcomes, through assessments, are used as indicators of ability in institutional settings such as schools, and learners' marks determine their capacity not just for the teachers, but for the learners themselves. Mathematics is formulated as the difficult subject, and Mathematical Literacy becomes the subject that they can actually "*cope with.*" Ease and speed of understanding allow the learner to be able to follow in

class and keep pace with their classmates. By transferring their mathematical capacity to an easier subject, returns are ‘higher’ and satisfaction is increased through higher marks.

Learners also expressed a liking for the subject.

> *Because I like it (Nedi High, F)*
> *Because I like mathematical literacy I like it (Nedi High, F)*
> *Because is cool for me (Nedi High, M)*

Venkat and Graven (2008) found that many learners in Mathematical Literacy classes had had negative experiences of mathematics in the years of schooling before Grade 10. The subject’s emphasis on expanding on known mathematical skills permits the learner to apply their knowledge. From grade 9 to grade 10, allocation to mathematics streams is linked to a learner’s aptitude and ability. Those who do not fulfil these requirements cannot take Mathematics and are by default in the Mathematical Literacy class. Difficulty in previous grades may make the learner want to display his or her ability in a space where they can, that is, through assessments. One learner emphasises his or her sentiments towards the subject through repetition without punctuation: “*I like mathematical literacy I like it*” almost as if to clarify and ensure that we understand her feelings towards the subject. This positive feeling towards the subject may be linked to the sense of Mathematical Literacy being useful. Experiences of success create a sense of self-efficacy (Bandura & Adams, 1977).These learners feel better about themselves as their effort has positive outcomes, in a way that can be measured in school scores. This is also noted in perceptions of understanding the subject content.

> *Because I understand it and how it works (Nedi High, F)*
> *Because Im good at measuring things (Nedi High, M)*
> *Because I am good in mathematical literacy (Nedi High, M)*
> *Because I know maths literacy (Nedi High, M)*
> *Because I understand it (Nedi High, M)*

The skills put to use in Mathematical Literacy are those that the learners already possess, what they are being taught is how to apply these skills (DoBE, 2011a). Those who might not have been comfortable in mathematics, though grasping the fundamental elements, find their strengths

being put to use in a way that is notable and being reflected in their achievements on assessments. A history of difficulty in mathematics taints future engagement in the subject, such that current and present and future experiences are framed in relation to the past. Difficulty and negativity in mathematics in Grade 9 and years before, affects learners' current experiences (Venkat & Graven, 2008). Perceived ease of Mathematical Literacy can make them feel that they can show skills and understanding in a way they could not have before. This is emphasised by some learners' accounts of previous negative mathematics histories.

> *Because I am not good enough in mathematical (Nedi High, F)*
> *Because I thought I wouldn't be able to give it my best (Simon High, M)*
> *Most people say mathematics is hard and so that's why I chose mathematical literacy (Simon High, F)*
> *I chose it because in my first term when I was doing mathematic I did not have tuition and it was getting tough (Simon High,F)*
> *I chose mathematical literacy because I am not perfect in mathematics (Nedi High, M)*

Mathematical Literacy is framed as an apt subject for the particular individual.

> *Because I think its a suitable subject for me (Nedi High, F)*
> *Because I think that mathematics is difficult for me. I only understand literacy (Nedi High, F)*

For these learners, a self-perception of ability and efficacy has limited what they think and believe themselves capable of. In light of Mathematics being perceived as both a 'hard' science and requiring an expenditure of intellectual effort, it is superior to Mathematical Literacy. Given that these learners express the 'inferior' subject as one that is better for them indicates a low valuation of their self-worth and ability. They are limited in that they "*only*" have the access to the knowledge of Mathematical Literacy. This conveys a sense that the Mathematics learner can access the content of both Mathematics and Mathematical Literacy, while the Mathematical Literacy learner is restricted to Mathematical Literacy only. The Mathematical Literacy learner is static: their knowledge is limited and limiting.

Current achievement here is framed in relation to past failure. Mathematical Literacy becomes a lesser alternative, one that is on offer to those who cannot succeed in the more difficult and more prestigious Mathematics. The learner who says "*I am not perfect in mathematics*" frames herself

as inadequate. The learner who decided to change subjects after a "*tough*" first term reinforces the perception of the difficulty of Mathematics and also the lack of ability in the learner who has to change academic tracks. These learners have internalised their previous failures in mathematics, and this underpins a self-governing mode (Foucault, 1982) whereby they exclude themselvesby believing that they are inadequate.These learners position themselves as mathematically unskilled; they are not competent enough, they are not good enough, they "wouldn't be able to give it [their] best." This self-policing is reinforced by comparing themselves to other learners who can do what they cannot do, well enough to succeed. Through years of schooling, teachers, among others, have entrenched a formulation of expectations and desires to control and model the behaviour of children, to make them the subjects they are believed to be, that they *come to be* (Foucault, 1982).Learners who are consistently told that they cannot succeed in mathematics, through overt expression or through low marks in tests and examinations,come to believe that that they cannot do Mathematics. They do not generally blame teachers or schools or inequalities in society; they seem to accept the ostensible meritocracy as fair and themselves as inadequate.

This also reflects an inequality in the provision of schooling and mathematics instruction. There is insufficient support for learners to assist them to succeed. The learner who accounts for her failure in Mathematics as linked to her not having a tutor, had clearly qualified for Mathematics and may have had the aptitude for success. Her emphasis that she required additional attention to what she was receiving at school points to the inadequacies of schools to meet the needs of struggling learners, such that they have to seek support elsewhere, or to change streams to those were they are not challenged. This unequal provision 'culls' the Mathematics population, ensuring that those who are in the Mathematics class can continue to achieve with the level of input currently provided by teachers, or despite poor teaching. Many learners were unable to qualify for the Mathematics class and had no choice but to take Mathematical Literacy.

> *Because I know it better and my marks were very low (Simon High, M)*
> *Because my marks were qualifying for it (Simon High, F)*
> *I didn't choose it. The school principal made me choose it because I failed last year English (Simon High, M)*
> *Because I failed grade 10 and I couldn't choose mathematics (Simon High, M)*
> *The school forced me (Simon High, M)*

It isn't that Mathematical Literacy is qualified for or preferred or that the learner has a better understanding of it, it is that they *could not do Mathematics*. Mathematical Literacy is the default position. One does not have to qualify for it, or make an effort to gain access to it. There is also the point of the school's input in the allocation of learners to particular streams. Learners from Nedi High had a higher occurrence of children not living with their parents and more unemployed parents, and the offering of Mathematics at this school was also more restricted. In the USA, black learners, their families, and their communities are burdened with the "rumour of inferiority" (Howard, 1986, cited in Powell-Pruitt, 2004, p. 236). This is a subtle and stifling reversal of the support, empowerment and affirmation of potential (and 'innate ability') that white learners experience (Powell-Pruitt, 2004). Socio-economic background is equated with race in many social interactions and access to social goods such as education (Apple, 2004) and this perpetuates the coincidence of race and class. In South Africa, the conflation of these social categories is entrenched and continues the Apartheid legacy. With so many children in the Mathematical Literacy stream, existing poverty and lack of resources is not addressed as these learners are also offered less access to the more difficult Mathematics and hence the possibilities of upward mobility are closed off. The schools aim to control their overall results, and to 'improve' their standing, they only allow learners who demonstrate some capacity to enter the Mathematics class. Learners with higher scores are of greater value to schools (Apple, 2004). Pass rates are a measure of schools' 'success'. The school also serves a punitive role to those who cannot cope with the load by not giving them a second chance to try to succeed. This 'subject choice' isn't a choice at all.

For a few learners, Mathematical Literacy was not a choice, but a consequence of their other subject 'choices'. As the school offers subject in packages, a learner who wants to take some subjects but not others might find themselves needing to take subjects they would not choose if they had the choice.Doing Mathematical Literacy for these learners, is a consequence and a 'necessary evil.'

> *It just came up on one of the subject groups (Nedi High,M)*
> *Because the subjects that I have chosen includes maths lit (Nedi High, M)*

Mathematical Literacy, for some learners, was not seen in its relationship to mathematical content. Rather, it is linked to language and meaning-making.

> *Because it mostly deals with vocabulary and I one day want to be the best english lecturer (Nedi High, M)*
> *Because I like it and it has english inside it so I like english (Nedi High, M)*

The subject's utility does not lie in its mathematical content, but in aspects unrelated to mathematics, here in language. It is important to note that the learners in Nedi High were not very comfortable in speaking English, and spoke haltingly and tended to laugh at one another's attempts to speak English. It is fascinating to see that the subject's intended conveyance of mathematical content has expanded into the conveyance of language skills. Mathematical Literacy's delivery of content has given these learners an avenue to improve English language development, improving their access to capital. The fact that the language of teaching and learning in South African secondary schools is English (DoBE, 2011a & b) and that it is the main language of instruction in tertiary institutions links it to cultural capital. The language of access is English, and their limited proficiency hinders their progress and limits their access (Bourdieu, 1986). Their limited vocabulary does not allow them to participate fully, so efforts to improve this become important.

Learners also expressed their reason for choosing Mathematical Literacy as it was suitable for their future plans.

> *Because my future job doesn't really need mathematics so I decided to take maths lit (Simon High, F)*
> *For my further studies when am finish with school (sic) (Simon High, F)*
> *Because I figured my family cannot help me financially (Nedi High, M)*

As with Mathematics learners, some Mathematical Literacy learners based their subject choices on what they intended to do when they finished secondary school. But for these learners, Mathematics is not essential. They believe that they do not need Mathematics, and have thus taken a different academic route. The final reason given, that the learner figures he could not receive financial support from his family for further study post-school, points, again, to a lack of

resources. The costs for higher and further education make it unattainable. This keeps underprivileged learners underprivileged, or at least limits their access to the benefits of education.

4.4 Conclusion

The themes from the Mathematics learners predominantly focused on aims and intentions. The status of Mathematical Literacy as a default subject for all learners may be the reason for the number of learners who state that they couldn't qualify for Mathematics, and the absence of Mathematics learners stating that they 'chose' the subject because they qualified for it. Mathematics learners do not have to qualify their presence in the Mathematics class. The Mathematical Literacy learners, on the other hand, have to explain their absence from the Mathematics class, rather than their presence in Mathematical Literacy.

With a minority of learners in Mathematics, resources can be concentrated on these learners, and expectations of hard work and effort keep the Mathematics learners productive, and deters weaker learners from challenging their allocation to Mathematical Literacy. The Mathematics subject is situated as superior, more important and more valuable than Mathematical Literacy. Mathematical Literacy has less value and gains. With the distribution of learners being greater in the Mathematical Literacy classes, the status of Mathematics as rarer and exclusive, is reiterated. Inequality of access to education still persists, but not through an overt exercise of power or racist legislation. These learners believe their lack of ability is their concern, their inadequacy. The unequal distribution of access then is incontestable as the lack of ability is felt to be due to the learner's defect. The institution of education equips learners with limited knowledge, and for many, this enables the entrenchment and reproduction of inequalities that go beyond schooling.

Chapter 5: Discussion of results - Phase 2

Interviews were analysed thematically across participants, including attention to nonverbal aspects of the interview. The female participants describe the contexts of their lives in and outside of school. Each particular extract describes an aspect of the theme it illustrates. The extracts are presented with the relevant length and detailed transcripts (following the more basic Jeffersonian notation) to situate the points of analysis in the context of the unfolding interview. Analysis of each extract entails discussing the theme, and provides further depth by illustrating *how* each theme is enacted by the participants in their talk.

In line with the descriptive data generated for the cohort as a whole in Phase 1, participants in Phase 2 also describe and speak about themselves and the sense of who they are in the world; their identities as adolescent girls. 1) Mathematical Literacy was seen as a subject that is easy, easier than Mathematics, and provides learners who cannot cope and succeed in the Mathematics class a space where they can achieve success.2) The difference between Primary and High school was important for the learners, particularly in terms of recognition and attention from teachers. 3) The capital value of Mathematics was apparent, making the Mathematics subject a point of reference which does not have to justify itself, and in relation to which other subjects, particularly Mathematical Literacy, become secondary, or 'second best'. 4) Parents and parental figures are sources of expectation and support, which is expressed and interpreted in different ways. The efforts of parents and parental figures are investments, and the actions and decisions made by learners as a result of this investment are seen as rewards. 5) Fear of failure makes learners choose academic pathways where they feel their abilities and skills will be adequate to achieve success.6) Achieving independence and what it means was also important, and also developing a sense that others can depend on them.People in the learners' lives affect their identity, in the sense that they understand their achievements (or lack of) as representing not just themselves, but those who are involved in their development. Lastly, 7) the emergence of sexuality in these participants, all female, is perceived as a 'threat' to their academic performance and as detracting from their future goals and aspirations.

The data indicate that for these learners, as emerging adults, their lives involve much more than schooling, though it does form a central aspect of their life. Schooling does not exist as an institution that deals only with academic instruction, but also produces and reproduces class,

gender and race categories, is integrated with the social institutions of politics, the economy and social hierarchies.

5.1 "Maths lit is easy."

Learners compared the two mathematics subjects in terms of levels of difficulty. Where Mathematics is difficult, Mathematical Literacy is seen as an easier, more manageable option. A history of experience in the mathematics classroom shaped perception and experience in their current stream, and the justifications for their choices.

Extract 1 - Ontiretse, ML, Simon High

R[6]*:Ok. So, why did you choose these subjects? Let's start with::, maths lit.*
O:Mm? Maths lit. Ah:, I'm not a very good person in maths. I don't wanna lie. And, all the algebraic expression::s, the:::,ja. The: wha- the? yho! I even forgot them because I don't like them. Ja. Haai they are to- I find them very hard. You know my problem is, if you teach me something now.
R:*[Mm?*
O:[Like maths? °ok°. I understand? And write it? But then when I have to do it on my own?
R:*((nods))*
O:I can't.
R:*((nods))*
O:So I find it hard, to do something on my own. Especially those algebraic expressions.

The difficulty of Mathematics is asserted as an incontrovertible fact and the assumptions that the subject is 'not clear enough' leads some learners to 'choose' Mathematical Literacy, which is perceived by many as easier and more approachable than Mathematics (Venkat& Graven, 2008). Ontiretse initially describes her inability to cope with mathematics: "Maths lit. Ah:, I'm not a very good person in maths." It takes a little bracing to 'admit' to her difficulty in understanding and success in the subject, and she even has trouble even expressing what she doesn't understand about mathematics from previous years of experience. "And, all the algebraic expression::s, the:::,ja. The: wha- the? yho! I even forgot them because I don't like them." The constant stop-start of her descriptions, verbal repression, ends in exasperation at the effort with "yho!" She continues her telling by emphasizing that her views on mathematics apply to her personally and specifically: "Haai they are to- I find them very hard." She amends her statement – from seemingly about to say that mathematics is 'too difficult,' she stops, repairs and says that *she*finds them very hard. Ontiretse frames her experience with mathematics as one where she

[6]R or Re refers to the researcher. The interview participant is represented by the initial of their pseudonym.

cannot achieve at the expected standard. The ‘myth of meritocracy’ is the apparatus of the institution, where the belief is that all individuals, from whatever background, can achieve excellence with hard work; only the deserving realisetheir goals (Fine, 2004). But Ontiretse has clearly not received adequate instruction if she finds it difficult to perform tasks on her own. Even with effort it feels impossible for her: “I can’t.” The inability to complete a mathematics task independently to being able to complete tasks without help is one of the changes that take place in the Mathematical Literacy class, as she continues to explain in Extract 2 below:

Extract 2 Ontiretse, ML, Simon High

R:*And anything, that was really positive?*
O:((Brow perks up)) uhm, oh one thing I did is, I once, corrected the teacher.
R:*Mm-hmm?*
O:She missed, she missed a step? and, I was there to help. I was so happy.
R:*Mm-hmm.*
O:cause it was my first time.
R:*((nods))*
O:Ja.
R:*So h- So how did you feel when you put up your hand, and you said,*
O:Yho I felt great, because, I- people were also, even my classmates?
R:*Mm?*
O:Were like wow. People are changing.
R:*((laughs))*
O:And I was like 'Yeah Wow.'
R:*((Laughs)) So how'd it make you feel, the, reactions of your classmates. What did that make you feel?*
O:Uh, some uh, some were jealous. And I was so happy.
R:*Mm.*
O:Because I also get jealous when, they::, answer: and I'm quiet, like I don't know anything?
R:*Mm. Mm-hmm. And how does that make you feel?*
O:Ah, now? ((shakes head and frowns)) I'm fine cause, I understand maths lit.
R:*((nods))*
O:More than,
R:*More than maths before now.*
O:Yes.

Where before there was little confidence, and hence a lack of active participation in class, Mathematical Literacy has changed in-class experiences into something positive and interactive (Venkat & Graven, 2008). Ontiretse had previously described a difficulty in understanding that hindered her performance, but now (doing Mathematical Literacy) she feels she has enough knowledge to be able to follow and to even note when the teacher has made an error: “oh one thing I did is, I once, corrected the teacher. /Mm-hmm?/She missed, she missed a step? And, I was there to help. I was so happy.” Her happiness at her “first time” participating in class in this way even assuages the sting of envy from her classmates. Personal perceptions of the self in a

context that centres on success and assessment can lead learners to view themselves as they believe others see them, as Ontiretse does here. She also vocalises the internalised audience of her classmates - the imagined others (Ezzy, 1998) frame her experiences. They, “were like wow” and she “was like Yeah wow.” Her experience, as seen through the filter of the real and internalised audience, shapes how she comes to see herself. Her own happiness and pride at her activity in the classroom is composed partly of the assessment of her peers, but overall, the subject affords her a sense of activity and participation: “Because I also get jealous when they::, answer and I’m quiet, like I don’t know anything? /Mm. Mm-hmm. And how does that make you feel?/Ah, now? ((shakes head and frowns)) I'm fine cause, I understand maths lit.” Mathematics can and does alienate the learners who find it difficult to understand and relate to, and this goes beyond answering questions and getting them right. Learners start to think of themselves in those terms; not answering translates into a sense that one doesn’t know anything; not participating becomes seeming like one does not ‘get’ what’s going on. Understanding, and the capacity to show understanding, increases the value that learners place on the knowledge they are gaining and increases their sense of self-worth. Positive results improve self-perceptions of ability to succeed (Bandura & Adams, 1977).

Learners spoke of understanding Mathematical Literacy in very personal terms. Their experience is not generalised, but specific to them, emphasising the relevance of Mathematical Literacy to their direct experience, as Sindile explains in the extract below:

Extract 3, Sindile, ML, Nedi High

R:*Uhm, so you said you do:? Maths lit.*
S:Ja.
R:*Why did you choose maths lit.*
S:((looks down)) Uh, I understand it? It's easy for me? Ja.
R:*((nods))*
S:(I think that.) I really understand it. All the time.
R:*And, the other:: maths?*
S:The maths pure. Well like I was thinking like, if: (.) I pass maths lit?
R:*((nods))*
S:Or my grade ten ne?
R:*((nods))*
S:When I go to grade eleven? I'll do maths:: pure. But I'm not quite sure.
R:*Why not.*
S:Because there will be physics.
R:*Oh:*
S:I don't want to- >and the other thing<, I hate failing.
R:*Mm.*
S:Ja. So I don't want to trouble myself, knowing that .hh ((looks at R)) I'll fail with physics.

Mathematical Literacy, for learners who have had trouble understanding mathematics in previous grades, is more accessible, and they tend to report that it is easier and that it makes more sense to them (Venkat & Graven, 2008). Sindile here asserts that she "understands" it. The emphasis, "I understand it" and "really understand it" indicates the stress that she intends to communicate about her experience, showing that her experience with mathematics before this was difficult and removed, as was reported by other learners in other studies (Venkat & Graven, 2008). What is interesting to note is that while she clearly states that "It's easy for me?" she states this in a questioning intonation. This suggests that Mathematical Literacy may still pose problems for others continuing perceptions of difficulty, but for her, speaking not on behalf of others but for herself, Mathematical Literacy is easy. It is also important to note that she claims to understand it "all the time." This consistency increases perceived confidence in tasks, and the individual feels more efficacious and capable (Bandura & Adams, 1977). As such, she even feels confident enough to possibly switch to a Mathematics class in grade eleven, but there is a sense of the conditional in this statement.

Though it appears that Mathematical Literacy learners may perceive themselves as more efficacious and capable from being able to complete the more accessible tasks of the subject, there is still a grain of uncertainty in ability, as in Sindile's talk here. The assertions of understanding are delivered in a speculative tone (the raised, conventional 'question' intonation) and the turn is ended with an affirmative response, as though she were agreeing with herself, or responding to a question she had posed to herself, or that she is trying to convince me as the listener that this is a legitimate position. Sindile also describes how she might switch to Mathematics, and this is stated in the conditional tense, framing this declaration as a possibility, but without much faith and confidence, and the uncertainty is explicitly communicated in "But I'm not quite sure." This uncertainty arises from the belief that failure in Mathematical Literacy is still possible, regardless her current sense of achievement. As Sindile says, "I don't want to->and the other thing<, I hate failing." Her expression is interrupted, abandoning the beginning of a statement to emphasise her desire to avoid failure. Her last statement supports this: "So I don't want to trouble myself, knowing that .hh ((looks at R)) I'll fail with physics." The avoidance of failure indicates how unlikely it is that she will switch to Mathematics (which accompanies physics in many schools), and that her trouble-dodging suggests that she will keep herself in the

place where she is more assured of success. Similarly Bulelwa described her choice as assuring her of progress:

Extract 4, Bulelwa, ML, Nedi High (original Sotho in appendix 10)

B:So, ((shakes head)) I saw that ai, there's no need to get myself stuck on one thing? Not moving ahead.

A fear of failure may lead learners to taking a path where they believe failure is not an eventuality, that they can work to avoid it in a space where achievement is possible. Though they have positive stories about achievement in the Mathematical Literacy class, these are punctuated by their belief that they are 'not good enough' for Mathematics. They have internalised this mode, and now they are able to police themselves and to enact their provided identity without continued governance from teachers and people around them (Foucault, 1982; Fine, 2004). They 'know' that they do not have the capabilities that Mathematics learners have, and accept this hierarchical structure of schooling and the implicit structuring of society and work opportunities as legitimate.

5.2 The difference between Primary and High School – "They don't care"

Learners described changes in experiences of schooling with the shift from primary to high school. Primary school was described as a place that fostered growth, was supportive, and generally had a more positive sense of care and of interaction than compared to high school.

Extract 5, Bulelwa, ML, Nedi High (see original Sotho text in appendix 10)

B:It was our class teacher and she like((wipes nose)), she told me that you are going to be, the best °leader.° A good leader. In grade seven eh like, we were in primary school right?
R:*((nods))*
B:Y'see we're young kids so our school we had things like dishing out food? Stuff like that.
R:*((nodding))*
B:So like, we liked to, even at assembly sometimes we would start songs?
R:*((nods))*
B:Quiet them when they were noisy >things like that<. It was, I would lead them, the way=
R:*((nods))*
B:=that I wanted to. In class if we weren't doing anything? I would take cards, (('handing out' motions)) and hand them out? We would work? I would mark?
R:*MM.*
B:So like.
R:*((nods))*
B:It's the way that- I would prove my, my uniform? They're there=
R:*((nods))*
B:=The certificates at home.

R:*((nods)) Mm.*
B:From primary. So. Ja. ((slouched posture, nods quickly)) I was ok.
R:*Mm. So you used to set an example.*
B:°Ah. Ja.°((wipes nose, looking away from R)) Until I got to high school I saw that ja [((laughs)) things have changed ne?
R: [*((laughs))*
B:Things have changed a lot.
R:((*nods))*
B:They've changed. .hh

Bulelwa's experiences in primary school were expressed as positive, desirable and perhaps she even feels nostalgic for her childhood. Primary school involves personal interaction, validating the individual among the group. This moment in the interview comes immediately after a moment of high emotion, where she had cried while talking about her at-home situation. Primary school and memories of it are a refuge and are constructed as quite idyllic. The active and direct acknowledgement that teachers provide is important and memorable. Her teacher telling her that she will be a great leader acknowledges her actions. She substantiates this view of the teacher with her descriptions of what she used to do, affirming her younger self and increasing the perception of efficacy, capability and esteem (Bandura & Adams, 1977). The handing out of the cards and leading the assembly in song, were actions that were not required but were appreciated. The girl child accepts responsibility and projects a responsible figure; she can be relied on and reward reinforces this process in that it was acknowledged in front of others: "It's the way that- I would prove my, my uniform? They're there= /*((nods))*/=The certificates at home." The "positive persuasory feedback" (Schunk, 1991, p.208), that is, feedback that rewards behaviour and persuades the individual to continue the reinforced behaviour, can entrench expectations of value. Bulelwa's conduct at primary school was rewarded and reinforced, but she did not receive the same attention for it in high school.

Shifts and changes in Bulelwa's speech indicate changes in her self-perceptions and her circumstance. In Bulelwa's telling of her teacher calling her a leader, the word itself is initially uttered markedly softly to everything else around it: "she told me that you are going to be, the best °leader.° A good leader" - bringing her to repeat it for emphasis, repeating it to the listener and herself, but downgrading it from "the best" to "good". She also slouches close to the end of this narrative and punctuates her deflated, depleted gesture with a terse statement emphasizing the past-ness of this state: "I was ok." This is both passed and in the past, and holds little bearing beyond memory, suggesting by implication that she is no longer "ok." This period of time is

shown to be perceived as definitely ended when she starts her shift into high school: “Until I got to high school I saw that ja ((laughs)) things have changed ne?” The laugh here, following a “ja” affirmation, is a derisory move. The realisation is a “risible twist” (Duncan, 2011, p.173), that the attention and care from primary school is absent in high school.

Extract 6, Bulelwa, ML, Nedi High (see original Sotho text in Appendix 10)

B:And then, end of the year? You get presents? We sing for our parents? There’s uh-pa- your prefects? You show your parents? °Things like that.°
R:*But in high school it isn’t like that?*
B:((soft tongue click)) High school? ((frowns, shakes her head and laughs)) it isn’t like that. I see it as like- in high school? Maybe it’s the way I see it. It seems to me that even the ma’ams they’re some who- who understand?
R:*((nods))*
B:Like, if they’re not used to you they don’t know you they’re not on your case.
R:*Mm.*
B:Like you’re even, you’re afraid to go to ma’am “I have this problem and that,”
R:*((nods))*
B:Ja. I see things as having changed a lot.

Bulelwa, in talking of the change in school context, continues to foreground positive primary school experiences by providing detail with the suggestion that more than what is explained, occurred: “°Things like that.°” She says this markedly softer than surrounding speech, supposing a drawing away from such activities, or that they have ceased. The loss of individuation and assimilation into the masses in high school takes away a sense of self-worth and agency. The belief and perception of one’s differentness and separateness is taken away, and only a select few are afforded this attention. Erikson posits that the individual self-concept is either supported by its socio-cultural context, which in turn strengthens the self and the culture, or it invites breakdown (Erikson, 1970). “The person and the person’s social world co-author identity” (McAdams, 2001, p. 116). When the culture or social context does not acknowledge identity, seeing the group rather than the self in the group, identity is not as affirming and has less support. The merit and credit accrued in primary school is useless currency in high school. This change is reflected on by the dismissive tongue click, the frowning, and again the derision in the laughter, and prevents the individual from approaching her teacher with problems that may affect her progress. A lack of qualified teachers in schools means employed teachers may have to take on tasks beyond what is required of them (Aboobacher, 2012) and teachers may be too taxed to be able to recognise problems with their learners, and they become unapproachable figures.

The interpersonal situation is exacerbated by a lack of material resources at the school, making learners feel personally ignored, and feeling a sense of despair in their place in the wider socio-economic context, and a sense that no effort is being made to improve the situation. Katlego's speaks of the desperate situation in a physics class in the extract below:

Extract 7, Katlego, M, Nedi High (original Sotho text in appendix 10)

K:When I didn't feel good? .hh °It's when,° that maybe y'see in the physics class. Often when we go to physics y'see?
R:*Mm?*
K:Sometimes, we're just there, doing nothing, And I see that here- at? Like at J. They do like they're ahead with work y'see? To me it seems really >because they always say< at Nedi High they say, that's not an education. ((licks lips)) And then I tell myself that at school they don't care about us they don't care. When we've failed they'll say, teachers don't go to class y'see.
R:*Mm.*
K:I'll tell myself that Hei! Even at physics? Sometimes- most of the time we do nothing? Y'see? I'll say it bores me >this subject because< I want us to- to be like other kids when they say today. We reached this section and we can say we also did the same thing.
R:*Mm.*
K:You know I can say that in physics, ((running motions)) we're ahead. Our exercises are::, they're behind.
R:*So you want to feel like other kids.*
K:Mm.
R:*You also, want to progress like them.*
K:Mm! Our work must be ahead like, the kids at J. My friends when- when we study at home, they look at us, we only have this much work you say "hei! We ((shakes head, looks down)) they don't give us work?" Sometimes we arrive and they put on this? What is it? The person speaking and you see them ((writing motions)) writing on the board.
R:*Mm.*
K:((licks lips)) Mm. We watch it and then it sometimes, it? Like, ma'am says "watch and wri- take notes." When you want to write then it has passed. 'Cause it's fast y'see.
R:Mm. *So, how do you feel. When that happens in class.*
K:I want- eish it irritatesme 'cause, I want the teacher to pay attention to us because you see physics is- it's a subject with a lot of work.
R:*Mm.*
K:So we should? Really it should be ahead.

The absence of a knowledgeable teacher is an issue in many schools across South Africa(Mohlala, 2008; Aboobacher, 2012). This lack of resources is made more acute in this case through comparison. Learners with friends in the same grade in other schools might compare their learning experience with others, and it highlights what is deficient in their context. The lack of a physics teacher is more acute as Mathematics and Science learners have to work with difficult content in vast volumes. Katlego, and others like her, must contend with a lack of resources in a serious subject in a school that does not have a good reputation. This non-fee paying school is associated with financial poverty and low academic outcomes. The correlation of poor resources and poor outcomes that is associated with such schools is well documented

(Aboobacher, 2012; Mohlala, 2008). Learners have to manage their own capability (as they are doing the same subject that other learners in other schools are doing) with their expectationsin a context of material and cultural lack in an underprivileged school. The desire to learn in the same way as their counterparts in privileged schools is not met. The reality of disadvantage is compounded with anticipation of failure: “at Nedi High they say, that’s not an education” and so, though learners want to do well, they don’t expect to. Conflict arises when the external world does not ‘line up’ with needs and desires, which are further thwarted by material realities. It was learners in this school who brought up financial troubles the most. Material and financial realities cause marked distress in learners. The learners feel uncared for and unattended to, *en masse* and individually. There is a sense of resignation in how the learners speak about the situation. They recognise the inequalities of the system but feel helpless and do not expect it to change.

Extract 8, Bulelwa, ML, Nedi High (original Sotho text appendix 10)

B:Athigh school unless you have friends-, to advise you? You’ll be cool because of, ((shrugs, shows palms)) it’s just like that.
R:*Mm.*
B:The ma’ams here ((shakes head, pulling lips into mouth)) Mm.
R:Ja.
B:(inaudible)
R:*((shaking head)) It’s not good support.*
B:((shakes head))
R:*Not really?*
B:Not really. ((points to herself)) Not me.

5.3 Mathematics as capital

With the high school context being experienced as inattentive and uncaring, the ones who do get attention are the valued learners, those who do Sciences and Mathematics. These subjects are perceived as valuable assets, and it is therefore recognised that those who do them need help and support. Mathematics is a subject that is highly selective, and it destines its learners to special circumstance.

Katlego had chosen to do Mathematical Literacy, even though she had gained enough marks to ‘qualify’ for Mathematics, a system that both Nedi High and Simon High use to determine which learners do Mathematics and which will not. Her choice was not well received, and she was ordered to join the Mathematics class after three days in the Mathematical Literacy class.

Extract 9, Katlego, M, Nedi High (original Sotho text in appendix 10)

R:*She? How does she feel. About the subjects that you're doing that youpicked.*
K:.hh ((looks away briefly)) no? She's happy because, you see and even? My sisters they tell her they're in university y'see? They tell her that hei! I chose this thing called tourism. It won't be easy to get a job because there are jobs that are selected for .hh for tourism this-this and with maths you can be a doctor do engineering? Those?
R:*Mm.*
K:Y'see lots of things.
R:*Mm.*
K:Then my mother said hei! At least sir helped me? Before he- he took me to? Physics >he called my mother really he said Katlego,< .hh she chose easy things and Katlego is clever y'see?
R:*Mm.*
K:And then he, my mother said he's right. Sir is 'sharp'.

Katlego's reaction to being moved from the Mathematical Literacy to the Mathematics class does not include her thoughts and feelings, only those of the other people involved. Before she commences her reply, she has an intake of breath (.hh) and looks away. These disengaging gestures indicate her disavowal, and she attempts to repair this through negation, but this itself is negated by the questioning intonation ("no?"). Katlego justifies her mother's happiness by pointing out the utility of the decision that was made for her by framing her decision as less useful: "My sisters they tell her they're in university y'see? They tell her that 'hei!' I chose this thing called tourism. It won't be easy to get a job because there are jobs that are selected for .hh for tourism this-this and with maths you can be a doctor do engineering?" Her sisters (and her teacher) know better because their knowledge surpasses hers, and tourism isn't a subject on the same 'level' as Mathematics – it's "this thing." The career opportunities that are open to those who study tourism are seen as limited, whereas with Mathematics, careers such as medicine and engineering are possible.

This aspect of opportunity with these subjects reflects high social capital. The individual obtains knowledge which affords them opportunities, such as potential access to a university education, which in turn will provide them access to superior benefits in their society, such as respect, admiration and standing, and an income(Bourdieu, 1986). Choosing Mathematical Literacy is thus framed as an absurd choice and nonsensical, particularly because she is "clever." Parents and other influential figures in children's lives have a direct influence in what the child does. This involves, at times, making choices on behalf of the child that the child may not see the benefit of. In the 'equation' of this sort of decision-making, the adult has a broader perspective

more mindful of the future and consequences, and of the kinds of social capital that the child may potentially deny themselves access to should they make particular decisions. It also suggests that Katlego does not have as much faith in her abilities as her teachers and parents. From this experience, Katlego is learning from her influential figures about her own capabilities. Teachers "make die or let live" (Lewis, 2009, p.178) – a teacher's affirmation and support build a learner's confidence.

Mathematics and its related opportunities are more valued than, in this example, tourism. As learners have to qualify to do these subjects, it indicates academic ability, and this opens up the path to formal higher education after high school. As access to these subjects and their corollaries (university education, high status, high paying and professional occupations) in many ways reifies the individual's academic ability and effort, they are seen as being 'worth' more than other subjects. It would be difficult, particularly for those who have placed their investments in such learners, to accept that such learners would not choose this path. Accepting the opportunity to do Mathematics is a pathway that does not have to be explained and accounted for, but choosing Mathematical Literacy does. The unconventional choice jostles the people around Katlego to action, with Katlego describing her teacher calling her mother, in abrupt, clipped words: ">he called my mother really he said Katlego,< .hh she chose easy things and Katlego is clever y'see?" There is a constant affirmation of her ability, and consequently, the teacher, and her mother's input. Parents, wanting the best for their children, push them into academic streams where they have a chance to access more opportunities, to allow them to rise above the economic status of their parents. South African Black mothers in particular have been shown to do this (Thomas, 1996). Their aim is to improve their children's lot, to benefit as much as they can from the changes brought about by democratic governanceaffecting intergenerationally the class mobility that was impossible for them. There is also the sense that individuals share their rewards of status and opportunity as they are constructed with the help of others. This identity can only be shared if the individual in question partakes in the activities and accepts the valued choices and performs the valued actions.

For learners to do Mathematics involves investment of time and effort. The mechanism of only taking learners from grade nine who show promise through academic achievement in preceding years ensures a measure of exclusivity, and also that only learners who are capable are in the

class (Bourdieu & Passeron, 1977). This shapes the young girls' sense of themselves and contributes to the construction of an identity as intelligent and hardworking. Ntombi reflects on the experience of coming to grips with the seriousness of the challenge of Mathematics in the extract below:

Extract 10, Ntombi, M, Simon High

N: When I- when I actually first touched my head, in:to:, maths. I was in grade eight.
R: *Mm.*
N: Ja that's when I started taking maths, seriously. After my first term report.
R: *Mm.*
N: Which was a, complete fail. It was a disaster.
R: *So what happened?*
N: Like, uh::, you know? When you, like, when you from primary, and you just,- from primary I always got, distinctions for maths.
R: *Mm-hmm?*
N: When I got to high school, I just relaxed completely telling myself ah you know what? Maths is maths. I know maths. I'm not gonna study this I'm not gonna waste my time I'm just gonna ~go with the flow~ a:nd, app(h)arently I fell on my face.
R: *((Laughs))*
N: ((laughing)) because, I III say I fell on my face because I I don't know, I jus:t, relaxed completely.
R: *((nods))*
N: To such an extent where like I had to just, pull up my socks as high as I could pull them up.
R: *((laughs))*
N: And start learning. Otherwise I just knew- you know here at school? we get our principal telling us that, he needs, sixty percent or eighty percent so that you can make it to a maths class
R: *Mm.*
N: From your grade nine and grade eight reports
R: *OO::h,*
N: So I knew that if I were to relax now
R: *mm.*
N: I wouldn't be able to take the course I wanna take and I wouldn't be able to make it to the course that I wanna do when I get to university.
R: *Oh I [see.*
N: [So I had to like, do my best from that point onwards.

Getting into a Mathematics class takes hard work from long before one has to make the 'choice' between subjects. Learners have to qualify for Mathematics, that is, they have to indicate through their academic record that they are fit for the Mathematics class. Effort, therefore, must be continuous and consistent. Mathematics needs to be taken "seriously."Ntombi's realisation that she would have to make an effort came about in high school: "When you, like, when you from primary, and you just, - from primary I always got, distinctions for maths." Primary school is framed as a place where things were possible, where success and achievement were goals that could be reached. There was minimal effort involved – "I always got, distinctions for maths." – but adopting this same laidback attitude in secondary school only led to failure: "I know maths.

I'm not gonna study this I'm not gonna waste my time I'm just gonna ~go with the flow~ a:nd, app(h)arently I fell on my face." The effort from primary school does not meet the requirements for the effort needed for success in high school. The presence of self-assurance and self-esteem does not always ensure that a person will succeed, but it increases their chances of continuing in the face of adversity (Bandura & Adams, 1977). The requirement of even more effort than is usually expended turns Mathematics into a commitment.

The extent of this previous self-assurance is seen through the repetition of descriptions of confidence without pause, save the first one. "I know maths." This declaration, though sure and final, is disastrously misplaced, and "app(h)arently I fell on my face." The unequivocal fail was experienced so strongly because it could have changed her intended course, of going to university and doing her desired course, all depending on whether or not she could get into the Mathematics class. Failure in Mathematics means more than not passing a particular test or assignment, but it can open up or block off a path to life beyond high school. Education is framed as the key to success.

Education is seen by Bourdieu as a means to achieve social and economic gains in life that an individual may not have as part what social advantages they receive from their parents, such as social status and prestige that can be conferred to an individual through higher education and highly skilled labour (Bourdieu, 1986). Education and its related social gains are desired by individuals, and they are desired for them by people in their lives, especially those directly involved in their choices and actions. Basetsana expresses a similar view about the value of school and education below:

Extract 11, Basetsana, Simon High, M

R:*So, what do you think your, sister wishes for you. For your life.*
B:Ok my sister wants me to succeed. (He) wants, to see me in a, better level. Than this one I am in?
R:*Mm.*
B:She wants to see me uh, educated?Ja and uh, safe. As well.
R:*Safe.*
B:Mmh-mm?
R:*As well.*
B:Yes.
R:*And your teachers? What do you think your teachers wish for you.*
B:Ok my teachers like, they know me that I'm a hard worker? I'm::, a very uh ((claps once)) top uh learner. So they are looking forward to see me in a very higher level than this one.

Education and schooling is a way to 'improve one's lot', to allow the individual options that were historically not available to their parents' generation in light of the limits imposed on individuals by the apartheid education system (Khuzwayo, 2005). The desire for social mobility is strongly expressed, as is the expectation of success, from the key figures in the learners' lives. Expectations of success affect how learners perform and perceive their performance.

5.4 In loco parentis: Investments and Rewards

Key figures, such as teachers and parents, have expectations for their children's or their learners' achievements. These figures' expectations sometimes arise from previous achievement on the part of the learner, and other times they arise from recognition of potential. Vygotsky describes the Zone of Proximal Development as the space between an individual's actual developmental level (what tasks they can complete independently) and the developmental level where an individual can complete a task with help and guidance(Vygotsky, 1978, cited in Chaiklin, 2003). Consistently pushing the learner to work harder and increase their knowledge through expectation can incite the learner to do just so. Basetsana shows how a learner can potentially introject such expectations in their construction of identity.

Extract 12, Basetsana, Simon High

B:This term. Uhm, like. On this topic I was so very excellent. Like before we write, an SBA- SBA is a test.
R:*Mm-hmm?*
B:Souhm we do, several? Class works. So I was so very perfect on this topic.
R:*Mm-hmm.*
B:Ok so, my ↑teacher prefer that, if someone is good? Let that person help others.
R:*Ok.*
B:So she asked me to help other children as well, that are learners. So I helped them a lot. And I hoped that the t- the day that we are going to write the SBA, I would be the top learner. .hh ((looks down)) but then!Uhm! The time came, and then we wrote the SBA. Oh! I do a- I did a very stupid mistake. It was so simple? That test was so very simple.
R:*Mm.*
B:But then because of, misunderstanding I didn't observe the object. Very well.
R:*Mm.*
B:I missed the step. So what happened? I failed ((claps once)) the test.
R:*Oh no.*
B:Ja. ((nods, laughs)) Yes. ((laughs))
R:*So what- what did your teacher say because you teacher is:, it seems like your teacher, looks out for you and it seems that you perform very well.*
B:Yho!
R:*[What did your teacher say.*
B:[Ja. She also know that I pass EGD very well but, she was so surprised and, ja. She said that she was very disappointed. ((nods))
R:*Wow how did that make you feel.*
B:Yho! Bad. ((laughs)) Even though I tried to explain to her that I did a very small mistake but, she doesn't want to hear anything. ((nods)) Ja.

There is pressure on the high-performing learner, not only to perform, but to serve as an example, and in Basetsana's case, to also help other learners who are struggling with content. All these multiple responsibilities put pressure on the learner, and they are expected to succeed and show progress. Basetsana's teacher clearly has faith in her and her abilities, but when this faith is betrayed, or results from the teacher's investments are not seen, there is disappointment. The expectation of excellence is so pervasive that any deviation from this expectation results in disappointment: "She alsoknow that I pass EGD very well but, she was so surprised and, ja. She said that she was very disappointed. ((nods))/Wow how did that make you feel./Yho! Bad. ((laughs)) Even though I tried to explain to her that I did a very small mistake but, she doesn't want to hear anything. ((nods)) Ja." Though both parties appear to understand that the mistake made in the test was small, it was important enough to result in failure. On the surface, the experience of disappointment from the teacher may seem excessive, given that it was a "small" mistake. But, the teacher's actions are effective in that she pushes Basetsana to work harder towards her potential instead of remaining in a place where she can be academically complacent (Chaiklin, 2003).

When Basetsana reaches the end of her story, "she doesn't want to hear anything. ((nods)) Ja." it is evident that she will not question her teacher's actions, at least in her presence, nor will she pursue the matter; the teacher's actions have been noted, agreed with and accepted, she concurs with her "Ja." At that moment it would not serve her well to disagree with the teacher. Though the situation is striking enough to be recounted as a memory in her narrative, she accepts it as the way things are, simply with a nod and an affirmative response. Basetsana's internal world features the figure of her teacher expecting a particular level of achievement, and in her case, this figure is perceived as positive. The expectations are in her best interest, or encourage her to hold a similar view of herself as capable of excellence. The model, her teacher, is believable, reliable and legitimate, giving strength to the assertion that Basetsana is capable (Bandura & Adams, 1977).

Key figures can also emphasise the importance of individual action on the part of the person. Though people live in societies, performing the required and valued actions eventually becomes the requirement and prerogative of the individual. Reneilwe's interaction with her teacher illustrates this:

Extract 13, Reneilwe, Nedi High

R:*Anduhm, what do you think your teachers. Wish for you.*
Re: Well my teachers are like my parents. You know. That's why I I respect them you know sometimes it's good to laugh with the teachers while you respect them. Because, you know? When- ey! there's this teacher? For maths Yho! If you don't write his work he just say ok he call you. Reneilwe. Come here. But Sir I don't know because of >this and this and this< and he'll say you know what? I've been teaching now for twenty years. And I've been, in school. And then, I know the tricks of a learner. You didn't write because of, you didn't have a textbook you didn't write because of, this and this and that. you d- you didn't write because of- you didn't want to. And further it's true but it's hard to admit.
R:*Mm.*
Re: And then I just ok. I'm so sorry. And they always say ok Reneilwe. Are you serious about life. Obviously I am serious about life. What do you want in life.Andyou, just start asking you, asking yourself all those questions. I just ok. ((licks lips)) Now then s- they are speaking sense in me. In me. And then ok. ((smacks lips)) °I can do this. Just to ke-° Then I'll listen to them.

The onus to complete the tasks necessary to succeed, and thus gain access to social capital, is placed on the individual. They can be provided with the urge and desire to act, but the act itself must be performed by the individual to legitimate it and to legitimate the individual's gains. The others already assimilated in society do not have to prove themselves, and they cannot perform on behalf of others in these acts. Reneilwe here is being made explicitly aware of this process. Her teacher does not have to pass high school; it was something he had done himself long before. The learner is explicitly redirected to display the desired behaviour. In another instance, this process can be quite emotional and in a way hurtful.

Extract 14, Sindile, ML, Nedi High (see original Zulu text in appendix 10)

R:*So how d- how does he react when you don't, you don't pass a subject.*
S:O::h ((looks down)) He'll be giving me hard time you know. Asking me why, every day. You come back to school. You've got your books. You study. But you come back with a fail. How come. ((looks up at R)) (.) And >every time,< ((looks past R)) when I'm at home. He'll tell me that, you have to study. You have to work hard. Life? This life. You have to work for yourself. ((looks at R))
R:*((nods))*
S:Ja. So when I come back with a fail, like, ((looks down)) he doesn't like it. Even if his wife. Yho! Especially his wife yho ha ((draws breath through teeth)) Even if, like last term.
R:*Mm.*
S:I really passed my subject. All of them.
R:*((nods))*
S:Ane? But she said to me, these subjects. Don't even impress me. DO you think you passed. With these subjects- with these marks ((grimaces)). ((shakes head)) No. That's bad. .hh passing like my::: my first? My first term marks.
R:*Mm-hmm.*
S:Were very good. Ja. I didn't even have- but I- this time I only have level two. Only on one subject. Tourism. So like hey! But my brother said, no you really passed but my- his wife said no. She didn't. She have to pass. More than this.
R:*((nods)) Mm.*
S:Because. You want something good for your life ne.
R:*Mm.*
S:Ja.

R:*SO how does it make you feel when your brother's wife says, you know this is not a pass.*
S:((shuts eyes)) first time I was angry. Why is she saying that. ((looks down)) Everyone in the class is saying that hey wena you passed you passed. But yena she is saying that no you didn't pass. But when I was sitting ((looks up at R)) alone I thought about it. And said that no maybe she is right. I want to go to the university and I won't go to the university with level two.
R:*Mm.*
S:That won't happen. and I'm doing maths lit. ((unclear))
R:*Mm.*
S:Ja. So m::, ((shrugs)) now I'm getting used to it. I just want to study? Pass? Just get the hell out of here. ((smiles))

Sindile's brother's (her guardian) reaction to her failure is quite hard, and emphasizes personal responsibility on her part, such as in Reneilwe's case. But her brother and his wife's expectation of excellence, downplay her actual achievements. "Even if, like last term./Mm./I really passed my subject. All of them./((nods))/Ane? But she said to me, these subjects. Don't even impress me. Do you think you passed.With these subjects- with these marks ((grimaces)). ((shakes head)) No. That's bad." Her pass, an improvement on her previous marks, was not acknowledged as a pass in its own right, and she is constantly being urged to aim higher and higher. Her guardians believe or know she can achieve more than what she is achieving at the moment, but their approach is experienced negatively: the effect of their 'tough love' angered her, humiliated her and belittled her attempts. It has made her adopt their standard of excellence, though she has trouble producing the results they, and she, desire. Their pushing and expectations do serve as a driving force, but the impetus to succeed is driving Sindile to find a way to escape, to "Just get the hell out of here." The issue of not being acknowledged can be problematic when the effort and its results are seen as inadequate. In Sindile's case, it pushes her to work in order toallow her to obtain escape. Bulelwa explains a similar sense of not being understood, as can be seen in the extract below:

Extract 15, Bulelwa, ML, Nedi High (Original Sotho text in appendix 10)

R:*So has something ever happened in class, or maybe, even at home that's related to school. Where you went hei? ((covers face)) °I can't believe that happened.° Like now you said, you didn't pass.*
B:Yes.
R:*°So,°-*
B:Like eh, school-going kids at home. Three of us? There's twins my brothers? And there's me-
R:*Are they older or? (Younger than you)*
B:They're older. Ninety three.
R:*Mm.*
B:So like we- I think, one has repeated three times. The other maybe four.
R:*Mm.*

B:And then since I started school, I've never failed.
R:*((nods))*
B:So. Even:,>if like<, even in other grades:, if I fail, maybe first term but pass the second term. And then this, and so on like that.
R:*Mm.*
B:And the fourth. So like, my mom was surprised. °She said°, ((shrugs)) why did you fail things like that she scolded me you see? And then I told her- I made her understand that it's my first year in grade ten. And like she knows they say most, where people fail is grade ten.
R:*((nods))*
B:So like, I'm trying my best.
R:*((nods))*
B:>Sometime- like< she'll scold me, .hh like I'll ask myself why. Because of, she's not the one studying. She doesn't understand what I'm reading. And how my mind works. Y'see?

The rift of misunderstanding between Bulelwa and her mother alienates the child from the parent. The pressure to get her to pass is experienced both negatively and positively. Bulelwa's context, or her brothers, have naturalised failing and repeating a grade. By contrast, her mother,*resists* the same for her daughter. What she has seen in her sons she does not want to see in her daughter. The propensity of mothers investing more in their daughters' education is not uncommon. A study done in 1996 found that Black mothers had a significantly bigger impact on the lives of their daughters than their sons, including the likeliness to push them harder to achieve in school (Thomas, 1996). The change from achievement in primary school years to difficulty in high school years also affects the people around the learner. Bulelwa, in this instance, experiences her mother's expectations of success as an unfair burden, but when considering her brothers' example, this concern may be seen as a push to success, away from the 'norm' of failure. She is pushed beyond her expectations of her capabilities, but finds it difficult to reconcile the difference between her perception of her ability and what her mother expects of her. It is notable that Bulelwa's story seems to emphasise her mother almost 'giving up' on her sons – they are not scolded, though they have repeated grades more times than she has. Her mother seems to have more faith in her daughter's intelligence and hard work than in her sons.

The process of growing up, coming of age and getting an education takes an investment of time, effort and money. This investment comes from the learner-child and the people in their lives including parents and teachers. Showing support for decisions and giving support in the decision-making process affords the learner-child self-confidence that arises from others' belief in them. Maryle speaks about the role of parental and teachers' support:

Extract 16, Maryle, M, Simon High

R:*So did anyone help you? With the, choices that you were making about your subjects?*
M:Ja. My mother has been my pillar of strength.
R:*Mm.*
M:Ja. She was always there for me? And then? I told her last year. That, at school? They want us to choose the subjects and she asked me that, what's your career and then I told her that I wanna be a medical scientist. then she told me that, do you know the careers that you should take? The? >The subjects that you should take?< I told her then. .hh ((swallows)) She said to me ↑ according to, to, her point of view ne? When she looks at my marks. She could see that, I do fit to do ((cracks knuckles)) physics and maths.
R:*Mm.*
M:Evennow I feel comfortable with those subjects. .hh I don't ((shakes head)) think that I'll ever change them. ((smiles))
R:*Ok that's cool.*
M:((laughs))
R:*uhm, so uhm do you feel that. your parents were supportive of the choices you were making.*
M:ja my parents were supportive.
R:*Mm.*
M:Even the teachers at school. Because, they used, to organise career guidance sessions for us if we had questions. .hh Regarding your careers. The people than, we were supposed to? To ask.Ja. And they also gave us the, ABC book.
R:*Mm?*
M:Which told us on different careers? And what were the, specifications? For those careers.

The selectedness of Mathematics means that there are rigorous procedures for deciding who becomes one of the class, and investing time and effort into ensuring this provides greater assurance to the learner and their parents for a spot in the class. Maryle's academic history gained her a spot in the class, and her mother's technique, of asking her what she wanted and why, and looking at her marks and agreeing with what her daughter is saying, allows Maryle to call her mother her "pillar of strength." Her mother's agreement that she 'fits' to do Mathematics confirms her belief in herself: "Even now I feel comfortable with those subjects." A person who does not feel competent and capable, even if they are able, will tend to avoid the activity/task in favour of something where they feel more assured of their abilities (Bandura & Adams, 1977). Teachers also play an important role in investing in pupils. They give of their time and resources.Along with parents, they persuade the learners into believing in themselves as, by virtue of their position, they can positively reinforce hard work and effort (Schunk, 1991). By contrast, none of the girls in the Mathematical Literacy classes spoke of teachers or parents' expectations or as supportive role models.

Learners do not want to feel like they have wasted their time, or the time of anyone who has put effort into them. Ruth, like many of the participants from Nedi High, brings up the role of money in the schooling endeavour.

Extract 17, Ruth, M, Nedi High (original Sotho text in appendix 10)

R:*What do you feel? They wish for you. What do they wish for you.Yourlife.*
Ru:((shakes head)) Shame they want us to succeed? You see I live in? (Pimville) when I come here I take a taxi. Six rand to come and six rand to get home every day.
R:*Mm.*
Ru: Now I don't want, when I fail? For my heart to be sore? Like, they'll scold me saying 'You wasted their money. Every day (I spend money).' Now (unclear) I aim to pass next time. Now I also don't want that, .hh to do- you know these days that. .hh there's teenage pregnancy? To have a child while still a child? Your parents passing away? And you're left- now I want that, for them to pass away, having seen me succeed.

There is a sense of guilt in failure, that resources put it to help have been for nought, and may have potentially been put into something else more needed in the family. Guilt and anticipation of guilt feelings show the emotions tied to these material investments. Learners want to live up to expectations, to deserve belief and investment, though the possibility of failure permeates. There is also an 'experienced' and 'viewed' aspect of success, that others should see you succeed. Ruth wants to succeed while her parents are still alive so that she can share her success with them. It was unclear, with Ruth, whether she was repeating the grade or not, but her expression of guilt, and that she aims "to pass next time," and the cutting off of this line of thought (with the resigned inbreath) suggest that something related to failure may be in her past or nascent. Either way, there are other difficulties that can hinder success, and she names them, and she does not want any of these to be a problem for her. She wants to succeed and to be regarded as a success. The idea of being a burden to her parents is not something that she desires. In particular Reneilwe expresses her anxiety about being a financial burden to her mother:

Extract 18, Reneilwe, Nedi High, M

R:*So you think a- wha- civil engineer? Things will be::*
Re: Ja. Easier and uh, faster because .hh as far as I know I will have to take my, three years?You know. Studying and then, one year doing some practicals if I have to and then, after I will be just working. Then I can help at home.

Extract 19, Reneilwe, M, Nedi High

R:*What did something happen before?*
Re:((laughs)) Ah! You know? That's why- uh, when I thought of, becoming a doctor, seeing my mum you know? Studying of, for all of those years and I just, it's ok. I can't be like her. I can't study like that >like my mum< I don't like studying. Actually.
R:*Mm.*

Re:I just study when, ah- when I have to. You know. Find that ok now? I haveto do th- I have to do this. I just do it. .hh But I- It's not like I don't- uh like it very much. Then I'm, .hh ↑seeing my mum study? You know? Doing all those things and you find that, her parents actually my grandparents were you know struggling to you know, take, take all- give her all those monies I said ok? ((licks lips)) I can't do this. I wanna do something simple? And, it's it's- that's what I want.

Career desires are changed to accommodate financial realities. We can interpret Reneilwe's decision to become a civil engineer as her perceived need to contribute an income to her household, and she even has some knowledge about what she will need to do for this to come true. Reneilwe's drive to change her career expectations from a doctor to an engineer arise from vicariously experiencing her mother's, and grandparents', experiences. ".hh ↑seeing my mum study? You know? Doing all those things and you find that, her parents actually my grandparents were you know struggling to you know, take, take all- give her all those monies I said ok? ((licks lips)) I can't do this. I wanna do something simple? And, it's it's- that's what I want." Reneilwe has seen the struggle of paying for education through her grandparents funding her mother's education. She has recognised that her aspirations entail long and expensive years of study, and has opted to take a less financially stressful path to spare her mother the stress she saw her grandparents going through. Clearly, Reneilwe is not altogether aware that the difference in studying for either profession is not too great, but her downsizing of expectations aims to decrease the burden and to add gain as soon as is possible. Though, in Reneilwe's opinion, she has downsized her career aims, she is still aiming quite high, and mobilising herself socially.

5.5 Fear of failure

The desire to continue in school, and to avoid failing the grade and needing to repeat it, may have learners opting for the easier subject. Generally, Mathematics is believed to be more 'difficult' than Mathematical Literacy, but Mathematical Literacy learners still face their own challenges, as expressed by Bulelwa in the extracts below:

Extract 20, Bulelwa, ML, Nedi High

R:*And, just now you said? You didn't do, you said you didn't do well in physical science in grade nine.*
B:Mm. [Natural science.
R: *[And maths?*
B:Ai, ↑maths, I was good at it. In PRIMARY.
R:*Mm.*
B:Where I saw things changing? Was in grade ten. ((points down, 'now' gesture))
R:*((nods))*
B:>Cause of<, what I was doing, ((counts off on fingers)) in primary grade seven? Eight and nine. I did them.
R:*((nods))*
B:Most of them. SO you know when I got to grade ten. ((so-so motion with hands)) it

started to change.
R:*Mm.*
B:And then, like. It- even maths lit. I don't pass it. ((shakes head)) Like, I failed the first term? Hhh second term ((laughs)) I failed. ((lowers head to laugh, mouth covered)) hh I fail it. I don't know why. But like it's, when I- I thought that, it was going to be easy.

Extract 21, Bulelwa, ML, Nedi High (see original Sotho text in appendix 10)

B:Ai I ((eyes wide, nods)) FAIL IT!
R:*((smiles)) Mm?*
B:And I don't know in December I, I manage here and there with assignments.

Previous academic performance frames what learners believe themselves capable of in school. Views of mathematical ability are traced from the past, and ability then frames the perception of ability now, in high school. Bulelwa frames her mathematics experience as in the past, but it is still quite immediate for her in that her current success is still interpreted against the measure from three years ago. Mathematical Literacy focuses on the application of previously attained content in specific contexts (DoBE, 2011a) but this does not simply translate into easy success for Bulelwa. As the subject is perceived as easier, failure is not expected. Failure takes on a sharper edge when it happens in a context where there is an expectation that it would not happen.

"even maths lit. I don't pass it. ((shakes head)) Like, I failed the first term? Hhh second term ((laughs)) I failed. ((lowers head to laugh, mouth covered)) hh I fail it. I don't know why. But like it's, when I- I thought that, it was going to be easy." The expectation that the subject would be easier renders failure an unbelievable occurrence. Bulelwa laughs and shakes her head in disbelief, as though what happened was not meant to happen. She parses her failure by each term, and her declaration of failure is released with a hard sigh: "hh I fail it." The laughter indicates a "risible twist" (Duncan, 2011, p.173), that the expectation of ease is actually experienced as unexpected difficulty and failure. A little later, failure is brought up again, more final and concrete, physical gestures assuring listener attention and emphasis: "FAIL IT! This raises doubt in future success and expresses her fear that she might fail the subject at the end of the year with her only hope residing in assignments.

The subjects of Mathematics and Mathematical Literacy create a hierarchy of knowledge where one is regarded as more valued than the other, requiring more advanced mathematical skill. The requirement of high previous mathematical achievement at both schools means that it is more

selected, that there is greater and more intense rigour in deciding who will be in the Mathematics class. Mathematical Literacy is then constructed as'not-Mathematics': it is (perceived as) easier and is more accessible to more people. Mathematics learners do see Mathematical Literacy as easier:

Extract 22, Reneilwe, M, Nedi High

R:*So just now you said maths lit is easy.*
Re:I think it's easy. >Not that,< people, who are doing to find it easy but, I think it is easy. I mean, it's not as difficult as, eh, maths. But? ((shrugs)) Never know.
R:*Mm.*
Re:I only know that mathemati- pure maths is the difficult one. But people who are doing maths lit they find? Maths lit difficult too. So it's .hh ((shakes head)) It's the way of- you find it. You find it hard and then it's hard.

Reneilwe, a Mathematics learner, had said earlier that Mathematical Literacy was easier, and when asked to elaborate, she used rhetorical devices to manage audience perception of her self. Her perception of Mathematical Literacy's ease is emphasized as her own, and she ensures that the Researcher understands that she speaks about it as an outsider, that "those who are doing it" may have a different opinion, "I mean, it's not as difficult as, eh, maths. But? ((shrugs)) Never know." Learners from both schools called Mathematics 'Pure Maths', concretising the dichotomy between Mathematics and Mathematical Literacy which is constructed as 'not-pure' and diluted or watered-down by implication. Reneilwe, though, makes a point to state that "It's the way of- you find it. You find it hard and then it's hard." The acknowledgement of the personal phenomenology takes into account individual differences, and it saves Reneilwe from adopting a vantage point that makes her appear proud to the point of narcissism. But, the perception the ease of Mathematical Literacy can also be pejoratively expressed even by those who do the subject:

Extract 23, Bulelwa, ML, Nedi High (original Sotho text appended)

B:So like, (actually) I chose these subjects, >cause of last year< I was in grade nine.
R:*Mm.*
B:I was confused. I didn't know what I was going to do? Haai I heard people say physics is difficult? Hey pure math- like, I know now that I'm in it, my cousin only doespure subjects ne?
R:*Mm.*
B:So she told me haai ↑it's better if you do, pure maths >cause of<pure maths is straight. And then in maths lit they ask you about kettle cords?
R:*((laughs))*
B:((laughs))

‘Pure Maths’, the difficult one with its corollaries, is held in high regard: “So she told me haai↑it’s better if you do,pure maths >cause of<pure maths is straight.” Mathematics’ importance is bolstered not just by its purity, but also because it has explicit outcomes. It is “straight.” Mathematical Literacy, on the other hand, in its aim to contextualize mathematics content, is presented as simple in almost ridiculously common sense terms, as here in learning about “kettle cords.” The abstract nature of Mathematics means it is adaptable to multiple contexts and allows for greater opportunities in higher education and employment. Though Mathematical Literacy is concrete in content, what it does for the learner does not have the multiplicity and adaptability of Mathematics. Its heavy focus on contextualisation fosters application but not conceptual understanding, rendering it more of a subject of action or the everyday, bordering on common sense. Learners perceive the clarity of Mathematical Literacy as ease in understanding and success. Mathematical Literacy’s ease becomes an escape, the easier track to follow, but the interpersonal influence of others can change a learner’s academic direction, as in Katlego’s case.

Extract 24, Katlego, M, Nedi High (original Sotho text in appendix)

K:I told myself that haai in maths lit! Maybe it’s like grade nine maths. Because they say, pure maths is hard.
R:*Mm.*
K:Y’see? And then, if I- Maybe? Maybe we hadn’t? W- we hadn’t gotten far °you see° maybe with? Learning y’see?
R:*Mm.*
K:Then, it was- I was? In? Maths::lit. Two days.
R:*Oh ok.*
K:And then, on the third day sir fetched me. He said on Monday- we mos opened on Wednesday.
R:*Mm?*
K:I went that Wednesday and Thursday. And then on::? Friday sir fetched me and said on Monday he should see me? ((fist in hand)) Pure maths.
R:*Mm.*
K:((licks lips)) And then I went there.

Her ability to qualify for Mathematics renders her decision to do Mathematical Literacy absurd to the people who have put in the time and the effort, as she has, to obtain the right to entry to a Mathematics class. Her intention was to avoid the difficulty of Mathematics, but she was instead made to do the subject. This is where the ostensible choice between the subjects is evidently not experienced as a ‘choice’. Mathematical Literacy is the default position, as some type of mathematics is now necessary from grade 10, all learners can do Mathematical Literacy.

Mathematics is the subject to which access has to be earned by learners who have shown that they are capable of learning and managing with the content. Mathematics is the subject that is 'chosen', through effort and success.

5.6 Independence

Economic pressures affect the type and range of decisions that people can make, particularly regarding their education and work(Bourdieu & Passeron, 1977). Monetary issues, whether in the past or experienced through the experiences of others, will lead parents to hope that their children do not suffer through the same hardships. Norma reflects on her parents' wishes for her:

Extract 25, Norma, M, Nedi High

R:*Uhm, so you what do you think, your parents wish for you.*
N:((lip smacking)) Uh::, My father? He'll tell you that "My child? I want you to be a doctor? ((draws breath through teeth)) Earn money in bucketfuls? Have,
R:*((chuckles))*
N:YES! Like serious. He says that. Earn he says. Have money. I don't want like, in life, for boys to fool around with your life?
R:*((nods))*
N:Give you a child and leave you like that? Then, you won't be all right. Your future really like, to let it fall away. Like,
R:*Mm.*
N:But like get educated? And earn your own money? And the person you're going to marry, they'll see that, if they say this and that you can also say ((nods)) 'I have my own things.'
R:*((nods)) Mm.*
N:So that, it won't be like, you won't depend on anyone.
R:*((nods))*
N:Depend on your education to say me?! I'm educated. I have mine. I have my own things. That I can depend on.

Parents do not want difficult lives for their children. Norma's parents' wish for her is that she become self-sufficient, and it is clear that they understand that this will be attainable through education. Financial independence is an issue in particular, and Norma expresses a view that many people have, that education is the 'key' to future success. The desire for a high, or at least comfortable, income is linked to the desire for a formal education. Cultural capital in the form of superior education, can be converted into economic capital (Bourdieu & Passeron, 1977). Being able to stand alone and support oneself is central, but often this is accompanied by the need for income in the household.

Parents desire things for their children that they did not have, or were denied the opportunity to have. Differential education across race groups in South Africa's past has left vast and deep

inequalities among the living population that continued beyond the change to democracy in 1994(Thomas, 1996). The lack of education that many people suffered carried economic and social difficulties, and these lead to a need, from parents who lived at that time, to aim for their children to have what they did not have: an opportunity to make something of themselves in the world. Though parents subtly or overtly express these desires, children may perceive that they are required to fulfil certain obligations to their family, such as financial betterment.

Extract 26, Bulelwa, ML, Nedi High (original Sotho text in appendix 10)

B:It's the life that I live? I'm used to it? I know that, I'll do it differently/bring change.
R:*((nods))*
B:There's no one else to- unless, .hh someone comes to offer me something. It's unless, it's like that but. From now on I'll do differently at home.
R:*((nods))*
B:So, °I'm ok with it.° Yes ((laughs)) the tears fall, because ((sniffs)) my heart is sore but. ((nods)) It's what we live with. And I've told myself that, .hh even if I don't have money, when I buy her that something?
R:*Mm.*
B:But. ((stabs pen into her palm)) I'm still(unclear). It's what I've told myself.

Difficulties with life at home, financially and interpersonally, can lead an individual to want to escape, as Sindile expressed above in extract 18, but it can also lead to an individual assuming responsibility for occurrences, and mainly, for change. Bulelwa's difficult relations with her mother have not impeded her from wanting to change both of their lives. She repeatedly affirms that her life is the only one she knows, and that she's grown accustomed to it, and speaks softly of her becoming accustomed to her situation, but when she speaks of change, she stresses her words, she displays more aggressive gestures. The present is common, current and undeniable, but she does resist it. "It's the life that I live? I'm used to it?...°I'm ok with it.° Yes ((laughs))." The way she explains this belies her words suggesting in fact that she isn't used to it. The raised intonation makes her present questionable, present with opportunity that can answer this question. Though she says she is accustomed to it, she is clearly not. Bolder gestures, the nods, and physically stabbing home the point that she will be the one to make the change, accompany her assertions of contrariness. She tends to use the word 'but' at a phrase end (where it sounds like a full stop would go), and this shows her intense desire to make things different in whatever way, big or small, that she can manage.

5.7 Representative Identity and the Threat of Sexuality

Erikson (1970) posits that youth rely on the coherence of the ideology of the world they are meant to take over from adults. This ideology can either be confirmed through the identity formation process or be weakened and give way to remaking and refashioning of new forms. Identity discourses set out by family, the community and so on, can highlight differential gender expectations (Lemke, 2008).Females are expected to be obedient, so much so that Bulelwa has interpreted it as her duty to improve her family's lot, even if she doesn't have the means to do it, even though she has siblings. The obedient, good daughter identity discourse is not only purported by families and communities. It is also endorsed by advertising, media and fiction, creating a convergence of these perspectives in the portrayal of a specific identity for girls learning to be adult women. This indicates the value of same-ness in society, of manageable expectations and outcomes (Lemke, 2008) though it reinforces a prevailing inequality. Erikson's (1970) suggestion of possibilities for change is very strongly resisted by the prevailing system, and the psychosocial position of these learners as children does not stack the odds in their favour: "A child is partly still an infant, partly a child of different kinds to different people and in different situations, and partly a person who has already begun to internalise and build a model of what it is like to be and play the part of those older than ourselves with whom we have learned to interact successfully" (Lemke, 2008, p.20). The child is precast; she is urged, guided and stretched to the mould of the adult they should become.

School going children are members and products of society, each with their individual and group desires. They identify themselves through their cultures, their communities and their societies, and they desire to be accepted into their groups as full members with adequate social capital (Bourdieu & Passeron, 1977). As members of a culture or society, they come to represent themselves and other members of the group in their actions, thus it is important to the individual and the people that they represent, that they perform their culture appropriately and in a way that best represents the group. Assimilation into culture and representing it can arise from participating in its activities and performing its rituals. Most activities are everyday and include learning conduct.

Extract 27, Maryle, M, Simon High (original Sotho text in appendix 10)

M:Where I come from. Kwa Zulu Natal. I enjoy being there because, .hh that's where I-
I could say I get groomed. Cause, my? Grandparents teach me how I should behave and,

the challenges that I will face and then, how I shoul- how I should behave in a marriage and all that stuff.

Learning the proper behaviour, and performing it, transmits culture and marks who is part of the group and who is not. The allocation of social capital, or status, lies in a process of performing actions that lead to a cultural goal or gain. Maryle's description of the "umemulo" (or female initiation) below is an example.

Extract 28, Maryle, M, Simon High

M:Ja so at the age of twenty one, my parents promised me that if I could continue, (('bring forth' gestures)) to carry myself in a good way I'll have umemulo. So I'll have to invite all of those friends that I'm, used to. And I've attended eh, several ceremonies. There.
R:*Mm.*
M:So it's, it's fun. Ja it's nice. Cause I get to, know- eh, different people and their, capabilities.
R:*Oh. So, what- can you uh describe the ceremony the memulo.*
M:Umemulo.
R:*Mm.*
M:Ok. Umemulo is a ceremony which is, done for a girl.
R:*Mm-hmm?*
M:Ane? And then, aferumemulo is then now you can consider marriage. Ja. It's only made for, girls, between, twenty one. Who are virgins.
R:*Ok.*
M:Ja.
R:*So are you- you- you sound like you're really excited by it.*
M:I'm really really excited I'm looking forward to it.

'Proper' behaviour, as is expected from a girl growing into a woman, involves chastity and good conduct. Being able to perform this ceremony is a marker in the community, and confers a certain status to the individual. This status is conferred not just on the individual, but the people around them. The girl's parents, in Maryle's example, become the *mother and father of* the child being rewarded, similarly to how teachers become *the teacher of* the learner who 'qualifies' to do Mathematics. The social capital is earned through their association, and was most notable in learners' responses to the question: "What do you think your parents/teachers wish for you?"

Extract 29, Maryle, M, Simon High

R:*And what do you think your teachers wish for you.*
M:I think my teachers, wish the best for me because, they know me that- .hh ((shakes head)) I don't- I don't- I don't engage myself in:::? In, in these useless things that most of the teenagers do.
R:*Mm.*
M:Ja. If you don't find me in class? I'm at the toilet. And then? And then, there's this teacher. Who taught me that eh my lifestyle and the one of my friend. M is very different from other learners. Cause, it's like, .hh The way we do things? It really, it really shows? That we are going somewhere.
R:*Mm.*

M:Ja. We don't enc- we don't encourage each other with doing bad things. Always, talk good.

By being exceptional teenagers and learners, Maryle and her friend M become ideal products of their teachers' efforts. They do not do "these useless things that most of the teenagers do" and are held in high esteem by their teachers, so much so that "It really, it really shows? That we are going somewhere." Their success becomes the success of the teacher's endeavour, and the product serves as testimony. The success of the product is the success of the producer. These girls, by performing valued acts and conducting themselves in a way that is accepted and expected by their culture and their society, reproduce their culture (Bourdieu & Passeron, 1977). Through their dedication to their education and 'proper' conduct, they reproduce their culture and place themselves in it.

The emerging sexual identity of the adolescent is seen as a risk to academic success, among others, such as social gain, and amorous contact, in cases here, with boys, can disrupt the intended life course.

Extract 30, Reneilwe, M, Nedi High

R:*So what do you think? Are your parents' wishes for you.*
Re: Hmm! My parents' wishes for me the best. Well because, you know these days you find that ok? One of your, parent's friends saw you, walking with ah- another boy and, oh! You know when you ge- when you get home, they will just tell you This Reneilwe! You shouldn't do this and this and that, because, .hh this and that will happen to you. And we want you to do this. So that you can, uh have? Something good you know. And they always say, w- you're not doing this for us.

Personal responsibility is placed on the individual to manage her own sexuality, meaning actually that it must be strictly controlled and set aside for the purposes of achieving goals that have been set out. Even what superficially looks like an amorous connection is perceived as a sex threat. Though her parents say, "And they always say, w- you're not doing this for us" they are also managing their own identities through her as parents. Relationships are discouraged as they can potentially interfere with future plans through pregnancy and disease. Their daughter's relationships also jeopardise their image of themselves as parents of a young woman with a future, parents who have taught their child right from wrong, and have warned her about the dangers of boys and sex. This threat is countered with puritan strictness, aiming to shut off any possibility of danger, such as in Ntombi's case.

Extract 31, Ntombi, M, Simon High

R:*So, what do you think, your parents wish? For you.*
N:Well, my mom always tells me that, uhm, she would like to see me, finish school?
R:*Mm?*
N:Without any kids, finish school while still a virgin?
R:*Mm?*
N:She says uh, she- she'd like to like, uhm, see me succeed. In my life and, have all my dreams come true but that can only happen if I work hard.

The connection between virginity, hard work and success, demonises sexual activity and this, in turn, links sexuality to lax work and failure. The girl who is not sexual is one who can concentrate on academic achievement and conduct herself as a 'proper' young woman. Female sexual identity is more tenuous and sensitive than male sexual identity and cultural norms and prohibitions exist to control girls' 'promiscuity' and 'loose morals.'For the parents, a sexualised daughter implies a lack of communication and instilling the appropriate morals in the girl-child; implying failure on their part. Gender is a grand determinant of an individual's chances of success in life from illness to career opportunities – daughters require more effort on the part of the parent to secure a future (Walkerdine, Lucey & Melody, 2004). There is no middle ground for the girl-child. Katlego's description of her mother's desire to keep her daughter 'intact' by moving her closer to her, and away from her less strict grandfather, exemplifies the link between the sex threat and success.

Extract 32, Katlego, M, Nedi High (original Sotho text in appendix 10)

K:Huh-uh, like, I used to live in Bramfischer before I? Came to high school.
R:*Mm.*
K:I lived with my grandfather and my mother's child.
R:*Mm.*
K:Her first born. I lived there before I came here and then when I? When I came to high school. My mother said 'Come live with me.' Because in Bramfischer my grandfather doesn't want kids to be scolded y'see?
R:*Mm.*
K:He treated us like, he didn't want us to get scolded? He wanted us to be? We- we were spoiled.
R:*Mm.*
K:Actually. ((licks lips)) Now my mother said, Hei? If you live in Bramfischer you'll, hei? You'll have ki::ds? And fool around y'see?
R:*Mm.*
K:Then,- from grade eight then like, I lived in Dlamini then.

By bringing Katlego under her direct supervision, Katlego's mother does not necessarily imply a lack of faith in her daughter's ability to conduct herself as she is instructed to. Rather, though she ought to be responsible, it would be safer and wiser to keep her under close watch, to be able to

intervene in time to avoid bigger issues. At times, parents can perform actions that can be interpreted as precautions against harm towards their children, particularly their daughters (Walkerdine, Lucey, & Melody, 2004). Daughters are constructed as in 'danger' in relation to sex. This construction frames sex as not something that a girl can do, but as something that happens to her. Katlego herself asserts that this is type of vulnerability is an issue for teenagers: sex and its corollaries, disease, pregnancy and gender-based violence (Pettifor, Measham, Rees & Padian, 2004).Violence is very often not far removed from coercive sexual practices, and pre-emptive action can seem a worthwhile option for a concerned parent.

Extract 33, Katlego, M, Nedi High (original Sotho Appended)

R:*So what do you think, that, your mother- that your mother. What do you think your mother wishes for you?*
K:My mother wishes that, I would? Finish school? Without a child maybe y'see? Because really lots of kids reach sixteen with kids of their? And then my mother she's proud to say 'at least you my child, you're reaching up? E n- you don't have a child? You conduct yourself well because really at home I behave. I won't say 'Hei! Ma they've called and I'm going out.' A? I spend time with my mother? And then she wishes that hei! I wish that my child can finish school and work?
R:*Mm.*
K:And then, I'll be ok.

Controlling sexuality, or chastity, becomes an imperative activity that the mother must instil in her daughter. This activity can only be policed to a certain extent, thus the daughter must also realise the value of chastity. This would make it a source of pride for both mother and daughter, in that the daughter is not like the others; the ones who partake in sexual activity and expose themselves to risks of disease, economic difficulty and academic damnation. The reminders of the mother's pride serve to remind the child of the value of resistance.

5.8 Conclusion

All the themes described above illustrate how identity, whether as perceived by the self, projected into the world or moulded by institutions is in constant development or change, and has multiple facets and is plural (Lemke, 2004). The effects and influence of parents, peers and teachers cannot be excluded from the 'choice' that a learner makes between Mathematics and Mathematical Literacy. Schools, as (explicit) institutions for instruction, situate children in positions in a system that clearly demarcates pathways beyond schooling, impacting outwards on adult economic and social prospects, and inwardson how the individual perceives of herself in

the world. Who I am and what I can do are persistent concepts that are framed in discourse, and chances of opposition and resistance are limited and very difficult to see through.

Chapter 6: Conclusion

Choices made regarding schooling, early in life, have a direct effect on the life of the adult. The adolescent's 'choice' between Mathematics and Mathematical Literacy can hardly be considered as a choice at all, as this report shows.Choosing a less valued subject will close off spaces of financial and cultural gain, and hardly anyone with a real opportunity for an actual choice will choose a lesser path, if they understood the consequences.

The conditions of high academic achievement required for Mathematics renders Mathematical Literacy the lesser and easier alternative. Mathematical Literacy's negative and positive aspects are one and the same. While it is not considered as rigorous and important as Mathematics, it is a subject in which learners can see themselves coping. The material is simpler and more accessible, but this is both beneficial for the struggling learner, who can display their knowledge, as much as it is pejorative, suggesting lower levels of ability and closing off of future aspirations. Mathematics' value lies in its future applicability and usefulness, while Mathematical Literacy, though current and readily accessible, does not bear much good for future prospects.

Findings from Phase one of the project showed that learners 'chose' Mathematics to improve their future prospects as it allowed them access to the careers of their choice and tertiary study. Mathematics was the means to attaining higher social status for themselves and their families. The learners who 'chose' Mathematical Literacy, on the other hand, emphasised the ease of the subject, their lack of skills in mathematics and that they felt they did not need Mathematics for their aspirations.

Findings from Phase two of the project showed that it is not only subjects that affect learners' experience of schooling, but also teachers and resources. Primary school was talked about as a Golden Age, where the learner was supported, encouraged and acknowledged. The current high school learner looked back at this time with poignant nostalgia and yearning. By contrast, high school (a Silver, or even Lead Age) had less emphasis on the individual and their individual achievements and improvements. Only those who stand out (for positive or negative reasons) received attention, and this attention could be experienced positively or negatively. A lack of resources and of qualified, skilled teachers can also leave learners feeling as though the system at large does not 'care'.

Mathematics is constructed as cultural capital and as a means of access to further cultural and economic capital. The value of Mathematics far outstrips Mathematical Literacy, for far as to appear as though Mathematical Literacy cannot hope to provide the same benefits as Mathematics. A focus on the possibilities of future study and employment was strong for Mathematics learners in that Mathematics seemed a guarantee of future prospects. Mathematical Literacy learners, on the other hand, did not have the same surety. Their focus on hopes and dreams to make a difference in their lives and in their families did not go beyond quite vague expressions of hope and desire.

Parents and teachers, as investors, models and figures expectant of success and positive representation, are key figures in the lives of learners. Pressure to perform well continuously, or to improve, may have arisen from a space of good intentions, but at times it was not perceived as such. Teachers and parents can be totems of good fortune and support, even forcefully nudging learners in a direction that they *know* will be good for them, or they can be spectres in the learners' lives, lurking and waiting for them to err to pass negative judgement. The effort and investment that these figures put into the lives of the learners is felt to be acknowledged and appreciated through success and improvement. Through this process, the child learns what is valued, accepted and expected from them.

Though parents and teachers may desire certain outcomes for their children or learners, the children may still resist preferred paths if they feel that they will not be able to cope in those situations. Being afforded the actual, true ability to choose between Mathematics and Mathematical Literacy may lead the learner to prefer the easier path, where they feel they may be able to show achievement, where they feel they are able to meet challenges and succeed. This may be a logical choice for an individual who does not have confidence in their ability to face challenges, or feel capable to give their full effort in the face of challenges.

While this fear exists, with pressures of expectations from others, and from the self, these adolescents want to be independent beings, able to provide for themselves and to provide for their disadvantaged families. In this way, they do not only represent themselves, but the people who brought them to their current situations, their parents, teachers and cultures. Their standing is challenged by their behaviour, most notable in their (control of) emerging sexuality. This inevitable development is expected to be reigned over. It must be made to submit to restraint to

allow the girl-child to achieve what they are capable of scholastically and beyond. There is nothing at all positive about sex for girls – babies and disease are the only possible outcomes, and either of these are impediments and stains on their lives.

Getting 'good' behaviour from a girl, capitalising on her intelligence, while positively representing her family and teachers, and disciplining her body to resist temptation that she must be protected from. Mathematics and Mathematical Literacy do not exist independently of society and culture. Their place and value in life run concurrent with many other things, as evidenced. Seeing the subject that a child does in school as isolated from their life discounts its benefits and detriments. Valuing, and devaluing similarly, influence how the growing child experiences themselves as an entity in their world.

This research project primarily focused on girls' narratives and experiences, and further research could extend the general profile for boys as presented in Phase 1 of the project. This project found that there were more girls than boys in Mathematics classrooms, and that girls held an emphasis on responsibility even where they were not explicitly called to it. It would be useful, in understanding children at this age, to also look at how boys perceive (if at all) of themselves as a minority in the Mathematics class, and their experiences of responsibility and sexuality as growing males in their families.

Future research might also investigate both girls and boys in more privileged schools. It would be beneficial to understand how children of privileged parents experience their 'choice' between subjects, the pressures that they face from themselves, their parents and their societies, as well as implicit and explicit experiences of their access to forms of capital.

Schools, and by implication subject choices, are not simple, linear decisions free of outside influence. Parents want what is best for their children, and will push their children if they believe that they have the potential to achieve. The expectations on these children aim to make them adequate members of their society, but also to situate them in particular ways that reproduce social hierarchies. For these girls, this also includes proper sexual behaviour, responsibility for themselves and their families, and also being upstanding representatives of their parents and teachers. Their perceptions of themselves integrate into a *gestalt* that, if not coherent, then attempts to function at homeostasis, meeting the individual's needs as well as those of their

influential figures as best they can.“The act of institution is the act of meaning... an act of communication, but of a particular kind: it signifies to someone what his identity is, but in a way that both expresses it to him and imposes it on him by expressing it in from of everyone and thus informing him in an authoritative manner of what he is and what he must be” (Bourdieu, 1991 cited in Fine, 2004, p.246). What one *can* do is supported or challenged by their contexts and significant figures, as well as their successes in their endeavours. Who one *is*, however, can change to accommodate tasks, contexts and intentions. It would be delimiting to think of any of these individual girls’ identity as strictly confined to school when talking about school as they always carry with them their lives and experiences.

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Appendix 1: Ethics certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

HUMAN RESEARCH ETHICS COMMITTEE (SCHOOL OF HUMAN & COMMUNITY DEVELOPMENT

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: MPSYC/13/008 IH**
PROJECT TITLE:	"Am I what I can do?" – Grade 10 learners' choices between Mathematics and Mathematical Literacy and questions of identity
INVESTIGATORS	Malahlela Dorcas
DEPARTMENT	Psychology
DATE CONSIDERED	24/05/13
DECISION OF COMMITTEE*	Approved

This ethical clearance is valid for 2 years and may be renewed upon application

DATE: 20 June 2013 **CHAIRPERSON** _____
(Professor A Thatcher)

cc Supervisor: Prof. J Bradbury

DECLARATION OF INVESTIGATOR (S)

To be completed in duplicate and one copy returned to the Secretary, Room 100015, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure be contemplated from the research procedure, as approved, I/we undertake to submit a revised protocol to the Committee.

This ethical clearance will expire on 31 December 2015

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix 2: Gauteng Department of Education Clearance

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

For administrative use:
Reference no. D2014/155

GDE RESEARCH APPROVAL LETTER

Date:	**15 July 2013**
Validity of Research Approval:	**15 July 2013 to 20 September 2013**
Name of Researcher:	**Mahahlela D.**
Address of Researcher:	**151 Alekhine Road**
	Police View
	Protea South
	1818
Telephone Number:	**073 537 5632**
Email address:	**sd189@yahoo.com**
Research Topic:	**"Am I what I can do?" - Grade 10 learners' choices between Mathematics and mathematical Literacy and questions of identity**
Number and type of schools:	**TWO Secondary Schools**
District/s/HO	**Johannesburg Central**

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

2013/07/16

1

Making education a societal priority

Office of the Director: Knowledge Management and Research
9th Floor, 111 Commissioner Street, Johannesburg, 2001
P.O. Box 7710, Johannesburg, 2000 Tel: (011) 355 0506
Email: David.Makhado@gauteng.gov.za
Website: www.education.gpg.gov.za

1. *The District/Head Office Senior Manager/s concerned must be presented with a copy of this letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.*
2. *The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.*
3. *A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.*
4. *A letter / document that outlines the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.*
5. *The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.*
6. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.*
7. *Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year.*
8. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.*
9. *It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.*
10. *The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.*
11. *The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.*
12. *On completion of the study the researcher/s must supply the Director: Knowledge Management & Research with one Hard Cover bound and an electronic copy of the research.*
13. *The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.*
14. *Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

.....

Dr David Makhado
Director: Education Research and Knowledge Management

DATE: 2013/07/16

Office of the Director: Knowledge Management and Research
9th Floor, 111 Commissioner Street, Johannesburg, 2001
P.O. Box 7710, Johannesburg, 2000 Tel: (011) 355 0506
Email: David.Makhado@gauteng.gov.za
Website: www.education.gpg.gov.za

Appendix 3: Research Information Letter (principal)

Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, WITS, 2050
Tel: (011) 717 4500 Fax: (011) 717 4559

To the Principal,

My name is Dorcas Malahlela and I would like to invite your school to participate in a research study that I will be conducting (as part of my Masters degree), under the supervision of Prof. Jill Bradbury. I am conducting a study on adolescents' choices between Mathematics and Mathematical Literacy and what this can tell us about identity.

I would like to request permission to work with the children in your school, namely the Grade 10 learners. My research project has two phases: Firstly, I have to administer a one-page questionnaire to all the Grade 10 learners in order to compile a profile of the school and its learners. Secondly, I would need to conduct interviews with six learners, three who are doing Mathematics and three who are doing Mathematical Literacy, for my investigation into mathematics, subject choices and identity.

The learners will be requested to fill in the questionnaire and to consider being interviewed. Those who do not want to participate in the interviews will be given information letters, consent forms and assent forms to take home to their parent/guardian. If they do decide to participate, these forms will have to be signed by both the student and the parent/guardian and thereafter the interview will be scheduled.

Interview participants will be asked questions about their experiences in classrooms, particularly for mathematics, and their extra-curricular activities. They will also be requested to bring a few photographs, if they have any, of particular periods in their lives, perhaps even school photographs.

The questionnaire and interview process will take place on site at your school, requiring no more than ten minutes for the questionnaire and at least half an hour for the interviews. I would request the use of free periods or Life Orientation periods to conduct research.

I would be grateful if I was permitted to collect this data from your school and its learners.

Here are my contact details.

Dorcas Malahlela
Phone: 0735375632
E-mail: sdl89@yahoo.com

Supervisor: Prof Jill Bradbury
Phone: 011 717 4515 (office)
E-mail: jill.bradbury@wits.ac.za

Thank you for your consideration,

Dorcas Malahlela

Appendix 4 : Demographic Questionnaire

Gender:_____

Race:_____

Home language(s):_____

Father's Occupation:_____

Mother's occupation:_____

Do you have any siblings? _____

If yes, what grades are they in or what work do they do?

_____

_____

Who helps you with your homework? _____

_____

Do you do Mathematics or Mathematical Literacy? _____

Why did you choose it? _____

_____

What was your final mark for mathematics in Grade 9? _____

What is your favourite subject at school? _____

_____

What do you think your personal strengths are? _____

_____

_____

What do you want to do when you finish school? _____

Appendix 5: Research Information Letter (participant)

Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, WITS, 2050
Tel: (011) 717 4500 Fax: (011) 717 4559

RESEARCH INFORMATION

"Am I what I can do?" – Grade 10 learners' choices between Mathematics and Mathematical Literacy and Questions of Identity

My name is Dorcas Malahlela and I would like to invite you to participate in a research study that I will be conducting (as part of my Masters degree), under the supervision of Prof. Jill Bradbury.

What is the purpose of this study?

I am conducting a study on adolescents' choices between Mathematics and Mathematical Literacy and what this can tell us about identity.

What will I be asked to do?

If you volunteer to participate in this study, I would either videotape or audiotape the interview in which you are involved. You will also be asked to bring some photographs of certain times in your life, including school photographs if you have them.

Will participating put me in any risk or cause me any inconvenience?

As part of this study, I am asking that you allow me to audiotape or videotape the discussions in which you participate. The recording equipment I will be using will be set up so that it will o\not distract you during the course of the session. The recordings from y\the study will be used for research purposes only.

Participating in this study is completely voluntary. You do not have to answer any questions that you would prefer not to answer. If you choose to be in the study, and feel any discomfort as a result of participating, you can change your mind and withdraw from the study at any time. If you want the data in which you appear to be withdrawn from the study, even after interviewing and taping has been completed, you can request withdrawal at any time by contacting me.

What will the recordings be used for?

The recording will serve as the dataset for my psychology masters research report, and may subsequently be prepared for presentation at professional research conferences and or publication in scholarly journals or books.

Will the information I give be confidential?

You may be concerned that the things you say or do during the interviews might be made public, and used against you in some way. I want to reassure you that your identity will be kept private, and you will not be personally identified in any research reports or presentations that are made available to public audiences. The tapes will be transcribed by the researcher, and all personal names and identifying details will be excluded from the transcript. You will not be identifiable from the transcriptions.

If you might happen to feel that some things you may say in the interview are very unique to your situation, or may make your identity somewhat apparent, be assured that none of this information will be made obvious in the transcript. Pseudonyms will be used, as will any other tool to mask any identifying information.

The recordings will not be destroyed following the completion of the study, as they will remain potentially useful for an indefinite period of time. However, they will be kept indefinitely in a locked storage area, and/or on password-protected computers. Only approved research personnel will have access to them, and only for research or educational purposes.

What are the potential benefits to me and to society?

This research project aims to explore the thoughts, feelings and views of ordinary people on a problematic population – prisoners, and exploring how ethical and moral standpoints vary when looking at this subsection of people. Not much research is done about prisoners and on prisoners, and looking into how they are perceived by non-prisoners will optimistically broaden knowledge and give insight to individual understandings, and perhaps even initiate the carrying out of more research.

Will I be paid to participate?

You will not receive any payment for participating in this study.

How can I get in contact with the investigators?

Dorcas Malahlela

Phone: 0735375632

E-mail: sdl89@yahoo.com

Supervisor: Prof Jill Bradbury

Phone: 011 717 4515 (office)

E-mail: jill.bradbury@wits.ac.za

Rights of Research Participants

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims or rights because of your participation in this research study.

Appendix 6: Consent form – Parent/Guardian

SIGNATURE OF RESEARCH PARTICIPANT

CONSENT TO PARTICIPATE IN RESEARCH (FROM PARENT/GUARDIAN)

If any questions you have about this research have been answered to your satisfaction, and you would like to participate in the research, please print your name and sign below.

In addition, please choose how you will allow recordings in which you appear to be used, by indicating below in which contexts you are willing to let these recordings be played (check all boxes that apply). Please remember that if these recordings are played in these settings, you may be identifiable to people who know you.

- ☐ Research reports written for publication in scientific journals
- ☐ Presentations delivered at scientific research conferences
- ☐ Seminar settings for the purposes of student instruction
- ☐ Lectures

_____

Name of Participant

_____ _____

Signature of Participant Date

Appendix 7: Assent form

SIGNATURE OF RESEARCH PARTICIPANT

ASSENT TO PARTICIPATE IN RESEARCH

If any questions you have about this research have been answered to your satisfaction, and you would like to participate in the research, please print your name and sign below.

In addition, please choose how you will allow recordings in which you appear to be used, by indicating below in which contexts you are willing to let these recordings be played (check all boxes that apply). Please remember that if these recordings are played in these settings, you may be identifiable to people who know you.

- ☐ Research reports written for publication in scientific journals
- ☐ Presentations delivered at scientific research conferences
- ☐ Seminar settings for the purposes of student instruction
- ☐ Lectures

_____

Name of Participant

_____ _____

Signature of Participant Date

Appendix 8: Consent for use of recording devices

SIGNATURE OF RESEARCH PARTICIPANT

CONSENT FOR USE OF RECORDING DEVICES

I, _____, consent to being interviewed by _____ for her study on _____ being tape-recorded.

I understand that:

- ☐ The tapes and transcripts will only be seen or heard by the researcher and her supervisor.
- ☐ My real name will not be used in the transcripts or the research report, but will be replaced by a false name.
- ☐ Tapes of the interviews will not be destroyed, unless participants request that the tape of their interview be destroyed.
- ☐ Tapes will be stored secure in a locked cupboard ora on a computer protected by a password.

Signed:_____

Date:_____

Appendix 9: Interview Schedule

What do you want to be when you grow up?

Tell me a story about your earliest memory about thinking about what you wanted to be.

What subjects did you choose? When and why did you choose them? Did anyone help youwhen you were choosing them?

What do you think about the subjects you chose?

Tell me a story about your earliest memory of learning maths.

Tell me a story about something that happened in the mathematics classroom that wasparticularly positive/ particularly negative. Why do you think you remember these moments?

Tell me about your favourite subjects and what you like about them. Do you have any particular memories about these classes?

Do you have any role models? Who? Why do you think of them as role models?

What do you think your parents' wishes are for you? And your teachers' wishes for you?

What do you do outside of school?

Appendix 10:Extracts in original language, with translations[7]

Extract 4, Bulelwa, ML, Nedi High

So, ((shakes head)) ka bona hore ai, there's no need hore ke itse ke tlabe ke stuck-e mo nto ei one? Ke sa tswele pele.	So, ((shakes head)) I saw that ai, there's no need to get myself stuck on one thing? Not moving ahead.

Extract 5, Bulelwa, ML, Nedi High

B:It was grade seven. And like, ((wipes nose)) neile class teacher ya rona and yena like, a ntshwetsa hore wena you are going to be, the best °leader.° A good leader. Ko grade seven eh like::, ne rile-ke primary akere? **R:***((nods))* **B:**°Wab' re bana ba banyane so° skolong sa rona neile nto tse tsaho paga? nto tseu. tse jwalo. **R:***((nodding))* **B:**So like, ne ke rata hore, le ko assembly sometimes re cale di pina? **R:***((nods))* **B:**Ha ba rasa re ba tudise >nto tse jwalo<. K'hore, ke baleade, the way, = **R:***((nods))* **B:**=Ne ke ratang ka teng. Ko classeng if hare etse niks? Ke nnke di cards::, (('handing out' motions)) Ke bafe one one? re sebetse? ke marke? **R:***MM.* **B:**So like, **R:***((nods))* **B:**Ke the way nje- ne ke prova from my:, uniform yaka? di teng.= **R:***((nods))* **B:**=Di 'tificate tse ko ntlong. **R:***((smiling)) Mm.* **B:**Tsa ko- from ko primary. So. Ja. ((slightly slouched posture, nods quickly)) Nne kele sharp. **R:***Mm. So no u setta an example.* **B:**°Ah. Ja.° ((wipes nose, looking away from R)) Until ube ke fihle mo high school kabona hhore ja di [((laughs)) nto dea chancha ne? **R:** *[((laughs))* **B:**Di nto di chanchile ha holo, **R:***((nods))* **B:**Di chanchile. .hh	**B:**It was our class teacher and she like((wipes nose)), she told me that you are going to be, the best °leader.° A good leader.In grade seven eh like, we were in primary school right? **R:***((nods))* **B:**Y'see we're young kids so our school we had things like dishing out food? Stuff like that. **R:***((nodding))* **B:**So like, we liked to, even at assembly sometimes we would start songs? **R:**((*nods*)) **B:**Quiet them when they were noisy >things like that<. It was, I would lead them, the way= **R***:((nods))* **B:**=that I wanted to. In class if we weren't doing anything? I would take cards, ((*'*handing out' motions)) and hand them out? We would work? I would mark? **R:***MM.* **B:**So like. **R:***((nods))* **B:**It's the way that- I would prove my, my uniform? They're there= **R:***((nods))* **B:**=The certificates at home. **R:***((nods)) Mm.* **B:**From primary. So. Ja. ((slouched posture, nods quickly)) I was ok. **R:***Mm. So you used to set an example.* **B:**°Ah. Ja.°((wipes nose, looking away from R)) Until I got to high school I saw that ja [((laughs)) things have changed ne? **R:** [*((laughs))* **B:**Things have changed a lot. **R:***((nods))* **B:**They've changed. .hh

[7]The translations were done by the researcher.

Extract 6, Bulelwa, ML, Nedi High

B:And then, end of the year::?Le tola di presente? Re binela batswadi? U nale uh- pa- (bo)prefect ba hao? U bontsa btaswadi ba hao? °Nto tse jwalo.° **R:***Mara mo high school ha go jwalo?* **B:**((soft tongue click)) High school? ((frowns, shakes her head and laughs)) Ha ho jwalo. Ke bona kare ho like- mo high school? Maybe, ke the way ke bonang ka teng. Ke bona kare like le bo ma'am ba teng honale batho ba- ba ba understandang? **R:***((nods))* **B:**Like, ha ba sao tlwayela ba sao tseba ha ba mo mo wena. **R:***Mm.* **B:**Like le wena, u tsaba ho ya ko ma'am ke nale botata bo so so so, **R:***((nods))* **B:**Ja. Ke bona okare mo di chanchile di nto hahulu.	**B:**And then, end of the year? You get presents? We sing for our parents? There's uh- pa- your prefects? You show your parents? °Things like that.° **R:***But in high school it isn't like that?* **B:**((soft tongue click)) High school? ((frowns, shakes her head and laughs)) it isn't like that. I see it as like- in high school? Maybe it's the way I see it. It seems to me that even the ma'ams they're some who- who understand? **R:***((nods))* **B:**Like, if they're not used to you they don't know you they're not on your case. **R:***Mm.* **B:**Like you're even, you're afraid to go to ma'am "I have this problem and that," **R:***((nods))* **B:**Ja. I see things as having changed a lot.

Extract 7, Katlego, ML, Nedi High

K:Me ne ke sa feeling good ko teng:? .hh °Ke mo,° hore maybe wabo' ko classeng ya physics. Sometimes hangata ha rea ko phyciscs wabo'? **R:***Mm?* **K:**Ke nale hore, re fithle re dule fela, re sa etse niks, and then ke bone hore, ko skolong se- ko? Like ko Junior. ba etsa like ba ko pele ka mosebetse wabo'? Kebone hore kutsho hore roan vele vele, >kobane wa tseba hore vele vele bare,< ko NC bare, he mole ha hona education e ncono. ((licks lips)) And then ka tsho hore maybe rona ko skolong se habana taba le rona habana taba. Ha setse re feitse vele vele re tlare, ma teachare ha ba attende wabo'. **R:***Mm.* **K:**Ka tsho kare hei! Ko physics le teng? Sometimes- hangata ha re etse niks? Wabo'? Ke tsho hore, nna yang' bora >ntwe kobane,< ke batla hore re e- re etse hore re tswane le bana babang habare, .hh today. rona ne rele mo le rona re re ja ne relo, le rona ne re etsa nto'eo. **R:***Mm.* **K:**You know ka tsho hore ei! Ko physcics, (('race' motions)) ha reo ko pele. Di exercise tsa rona di ko::, di ko morao. **R:***So u batla go feela kare, llwena u etsa tjeka bana babang* **K:**Mm. **R:***Llwena, u progressa tjeka bana babang.* **K:**Mm! Mosebetse wa rona ube ko pele jwale	**K:**When I didn't feel good? .hh°It's when,° that maybe y'see in the physics class. Often when we go to physics y'see? **R:***Mm?* **K:**Sometimes, we're just there, doing nothing, And I see that here- at? Like at Junior. They do like they're ahead with work y'see? To me it seems really >because they always say< at NC they say, that's not an education. ((licks lips)) And then I tell myself that at school they don't care about us they don't care. When we've failed they'll say, teachers don't go to class y'see. **R:***Mm.* **K:**I'll tell myself that Hei! Even at physics? Sometimes- most of the time we do nothing? Y'see? I'll say it bores me >this subject because< I want us to- to be like other kids when they say today. We reached this section and we can say we also did the same thing. **R:***Mm.* **K:**You know I can say that in physics, ((race motions)) we're ahead. Our exercises are::, they're behind. **R:***So you want to feel like other kids.* **B:**Mm. **R:***You also, want to progress like them.* **K:**Mm! Our work must be ahead like, the kids at J. My friends when- when we study

ka, bana ba ko junior. Di chomie tsaka ha-ha re lo studisha ko gae, diri sheba rona, renale di classwork tse kanang kanang mo utsho hore ei! Rona ((shakes head, looks down)) ha ba refe di classwork? Sometimes rea fitla rea dula ba re bulele ntwe? Bare keng? E ya ho bua and then motho ntsa ((writing motions)) ngwala ko boarding. **R:***Mm.* **K:**((licks lips)) Mm. Re shebeletse and then ntwe la sometimes, enale? like, ma'am are, shebang le ngw- le nke di notes. Ha le sare u ngwala e e fitile. Kaubane i fast wabo'. **R:***Mm. So, u feela jwang. Ha go etsagala jwalo ko classeng.* **K:**Nna ke batla- eish yang bora ntweo kobane, ke batla le rone gore ma'am are nage kobane wabona ko physics ke nto- ke subject ya mosebetse o mongata. **R:***Mm.* **K:**So tswan'tse? Vele vele e be ko pele.	at home, they look at us, we only have this much work you say "hei! We ((shakes head, looks down)) they don't give us work?" Sometimes we arrive and they put on this? What is it? The person speaking and you see them ((writing motions)) writing on the board. **R:***Mm.* **K:**((licks lips)) Mm. We watch it and then it sometimes, it? Like, ma'am says "watch and wri- take notes." When you want to write then it has passed. 'Cause it's fast y'see. **R:**Mm. *So, how do you feel. When that happens in class.* **K:**I want- eish it irritates[8]me 'cause, I want the teacher to pay attention to us because you see physics is- it's a subject with a lot of work. **R:***Mm.* **K:**So we should? Really it should be ahead.

Extract 8, Bulelwa, ML, Nedi High

B:Kohigh school is unless u nale di friends-, di tsona di ho advise? U be (cool) because of, ((shrugs, shows palms)) ho jwalo fela. **R:***Mm.* **B:**Ha mo di ma'am tse, ((shakes head, pulling lips into mouth)) Mm. **R:***Ja.* **B:**(inaudible) **R:***((shaking head)) It's not good support.* **B:**((Shakes head)) **R:***Not really?* **B:**Not really. ((points to herself)) Not me.	**B:**Athigh school unless you have friends-, to advise you? You'll be cool because of, ((shrugs, shows palms)) it's just like that. **R:***Mm.* **B:**The ma'ams here ((shakes head, pulling lips into mouth)) Mm. **R:***Ja.* **B:**(inaudible) **R:***((shaking head)) It's not good support.* **B:**((shakes head)) **R:***Not really?* **B:**Not really. ((points to herself)) Not me.

Extract 9, Katlego, M, Nedi High

R:*U? U feela jwang. Ka:: gore u pickile: subjects tse u di etsang.* **K:**.hh ((looks away briefly)) no? U happy kaubane, wabona ene le bo? Aus' baka ba mo bulela bako university wabo'? Ba mo bulela hore hei! Ke choositse ntwena bare ke tourism. Ho kase be easy hore a tole mosebetse kobane honale mesebetse e choositsweng hore .hh for tourism eng eng ene ka maths wa etsa bo doctor wa etsa di engine::er? Tseo? **R:***Mm.* **K:**Wabo' nto tse ngata. **R:***Mm.* **K:**Then mme waka are hei! At least ung tusitse sir kaubane sir o? Before ang- ang keisa ko? Physics >u ile a phonela mmaka	**R:***She? How does she feel. About the subjects that you're doing that youpicked.* **K:**.hh ((looks away briefly)) no? She's happy because, you see and even? My sisters they tell her they're in university y'see? They tell her that hei! I chose this thing called tourism. It won't be easy to get a job because there are jobs that are selected for .hh for tourism this-this and with maths you can be a doctor do engineering? Those? **R:***Mm.* **K:**Y'see lots of things. **R:***Mm.* **K:**Then my mother said hei! At least sir helped me? Before he- he took me to? Physics >he called my mother really he said Katlego,< .hh she chose easy things

[8]"Go bora" can mean both boredom and or irritation.

vele are Katlego,< .hh u choositse di nto tse easy ene Katlego u- u hlalifile wabo'? **R:***Mm.* **K:**And then he, mamaka are u right. Sir u sharp.	and Katlego is clever y'see? **R:***Mm.* **K:**And then he, my mother said he's right. Sir is 'sharp'.

Extract 14, Sindile, ML, Nedi High

R:*So how d- how does he react when you don't, you don't pass a subject.* **B:**O::h. ((looks down)) He'll be giving me hard time you know. Asking me ukuthi, everyday. You come back to school. U ya path'i ncwadi zakho. U ya funda. But you come back with a fail. How come. ((looks up at R)) (.) and, >every time,< ((looks past R)) u ma ngi hlele endlini. He'll tell me ukuthi, you have to study. You have to work hard. Life? This life. You have to work for yourself. ((looks at R)) **R:***((nods))* **B:**Ja. So when I come back with a fail, like,((looks down)) he doesn't like it. Even if his wife. Yho! Especially his wife yho ha ((draws breath through teeth)) Even if, like last term. **R:***Mm.* **B:**I really passed my subject. All of them. **R:***((nods))* **B:**Ane? But she said to me, these subjects. Don't even impress me. DO you think you passed. With these subjects- with these marks ((grimaces)). ((shakes head)) No. That's bad. .hh passing like my::: my first? My first term marks. **R:***Mm-hmm.* **B:**Were very good. Ja. I didn't even have- but I- this time I only have level two. Only on one subject. Tourism. So like hey! But my brother said, no you really passed but my- his wife said no. She didn't. She have to pass. More than this. **R:***((nods)) Mm.* **B:**Because. You want something good for your life ne. **R:***Mm.* **B:**Ja. **R:***SO how does it make you feel when your brother's wife says, you know this is not a pass.* **B:**((shuts eyes)) first time I was angry. Why is she saying that. ((looks down)) Everyone in the class is saying ukuthi hey wena you passed you passed. But yena she is saying ukuthi no you didn't pass. But when I was sitting ((looks up at R)) alone I thought about it. And said ukuthi no	**R:***So how d- how does he react when you don't, you don't pass a subject.* **B:**O::h ((looks down)) He'll be giving me hard time you know. Asking me why, everyday. You come back to school. You've got your books. U study.[9] But you come back with a fail. How come. ((looks up at R)) (.) And >every time,< ((looks past R)) when I'm at home. He'll tell me that, you have to study. You have to work hard. Life? This life. You have to work for yourself. ((looks at R)) **R:***((nods))* **B:**Ja. So when I come back with a fail, like, ((looks down)) he doesn't like it. Even if his wife. Yho! Especially his wife yho ha ((draws breath through teeth)) Even if, like last term. **R:***Mm.* **B:**I really passed my subject. All of them. **R:***((nods))* **B:**Ane? But she said to me, these subjects. Don't even impress me. DO you think you passed. With these subjects- with these marks ((grimaces)). ((shakes head)) No. That's bad. .hh passing like my::: my first? My first term marks. **R:***Mm-hmm.* **B:**Were very good. Ja. I didn't even have- but I- this time I only have level two. Only on one subject. Tourism. So like hey! But my brother said, no you really passed but my- his wife said no. She didn't. She have to pass. More than this. **R:***((nods)) Mm.* **B:**Because. You want something good for your life ne. **R:***Mm.* **B:**Ja. **R:***So how does it make you feel when your brother's wife says, you know this is not a pass.* **B:**((shuts eyes)) first time I was angry. Why is she saying that. ((looks down)) Everyone in the class is saying that hey wena you passed you passed. But yena she is saying that no you didn't pass. But when I was sitting ((looks up at R)) alone I thought about it. And said that no maybe

[9] 'Funda' means both read and study

maybe she is right. I want to go to the university and I won't go to the university with level two. **R:***Mm.* **B:**That won't happen. and I'm doing maths lit. ((unclear)) **R:***Mm.* **B:**Ja. So m::, ((shrugs)) now I'm getting used to it. I just want to study? Pass? Just get the hell out of here. ((smiles))	she is right. I want to go to the university and I won't go to the university with level two. **R:***Mm.* **B:**That won't happen. and I'm doing maths lit. ((unclear)) **R:***Mm.* **B:**Ja. So m::, ((shrugs)) now I'm getting used to it. I just want to study? Pass? Just get the hell out of here. ((smiles))

Extract 15, Bulelwa, ML, Nedi High

R:*So kile gwa etsagala something ko classeng. ore maybe, even ko lona it's related to school. Mo ureng hei? ((covers face)). °A ke believe gore go etsagetse nt'we so.° Like gona nou u itse::, ha wa passa.* **B:**Ea. **R:***°So,°-* **B:**Like eh, re kena skolo ko ntlong. re i three? Ke ma twins a e two ki bo abuti baka? And then le nna- Ba ba golo ore? (ba ba nyano mo wena) Ba ba golo. Ninety three. **R:***Mm.* **B:**So like re- I think, o i one u repeata three times. O o mong kare ke wabe s'four. **R:***Mm.* **B:**And then nna since ke thoma skolo, a ke so faili. **R:***((nods))* **B:**So. Even:,>if like<, le ho di grade tse d'eng:, le ha nka faila, maybe first term second term ke passa. And then this, le jwalo jwalo. **R:**Mm. **B:**Le fourth. So like, mm'waka na maketse. °Are°, ((shrugs)) why u faila nto tse jwalo wang' cheeka wa bo? And then kea mo jwetsa- ke mo etsa hore a understande hore it's my first year ke etsa grade ten. Ene like wa tseba ma hore bare most, mo ho fail'wang ko teng ke grade ten. **R:**((nods)) **B:**So like, I'm trying my best. **R:***((nods))* **B:**>Sometime- like,< ang' cheeke, .hh like ke i putse hore why. Because of, ha ho bale yena. Ha understande di nto tse nna ke di balang. Le kelello yako hore e jwang. Wabo?	**R:***So has something ever happened in class, or maybe, even at home that's related to school. Where you went hei? ((covers face)) °I can't believe that happened.° Like now you said, you didn't pass.* **B:**Yes. **R:***°So,°-* **B:**Like eh, school-going kids at home. Three of us? There's twins my brothers? And there's me- Are they older or? (Younger than you) They're older. Ninety three. **R:***Mm.* **B:**So like we- I think, one has repeated three times. The other maybe four. **R:***Mm.* **B:**And then since I started school, I've never failed. **R:***((nods))* **B:**So. Even:,>if like<, even in other grades:, if I fail, maybe first term but pass the second term. And then this, and so on like that. **R:***Mm.* **B:**And the fourth. So like, my mom was surprised. °She said°, ((shrugs)) why did you fail things like that she scolded me you see? And then I told her- I made her understand that it's my first year in grade ten. And like she knows they say most, where people fail is grade ten. **R:***((nods))* **B:**So like, I'm trying my best. **R:***((nods))* **B:**>Sometime- like< she'll scold me, .hh like I'll ask myself why. Because of, she's not the one studying. She doesn't understand what I'm reading. And how my mind works. Y'see?

Extract 17, Ruth, M, Nedi High

R:*Wena what do you feel? Ba wisha eng for wena. What do they wish for you.Your life.* **Ru:**((shakes head)) Ba funa shame ukuthi si	**R:***What do you feel? They wish for you. What do they wish for you.Your life.* **Ru:**((shakes head)) Shame they want us to

phumele gade? Yabona ngi hlala e? (Pimville) ma ngiza la ngi phuma nge taxi. Six rand uku hamba six rand uku buya every day. **R:***Mm.* **Ru:**Manje ang' thandi ukhuti, mang'a faila? E nhliziyo yami, eba b'hlungu? Eba like, bang tetisa bathi ini u dlala nge mali yam. Every day (ngi guph' imali). Maje (unclear) ngizimisele ngi zo passa next time. Manje nami ngiyafuna angi fun' ukuthi, .hh ngizi pathe ukuthi- uyabona these days khuti .hh ku nama teenage pregnant? U nomntwana u sa se ncane? Ba abazali bakho ba shone? U sale u fi- manje mina ngi fun' ukuthi, bafe se, ngi phumelele.	succeed? You see I live in? (Pimville) when I come here I take a taxi. Six rand to come and six rand to get home every day. **R:***Mm.* **Ru:**Now I don't want, when I fail? For my heart to be sore? Like, they'll scold me saying 'You wasted their money. Every day (I spend money).' Now (unclear) I aim to pass next time. Now I also don't want that, .hh to do- you know these days that. .hh there's teenage pregnancy? To have a child while still a child? Your parents passing away? And you're left- now I want that, for them to pass away, having seen me succeed.

Extract 21, Bulelwa, ML, Nedi High

B:Ai kea e ((eyes wide, nods)) FAILA! **R:***((smiles)) Mm?* **B:**ene a ke tsebe ka Desember ke, ke hore ke thusa mo le mo ka di assignment.	**B:**Ai I ((eyes wide, nods)) FAIL IT! **R:***((smiles)) Mm?* **B:**And I don't know in December I, I manage here and there with assignments.

Extract 23, Bulelwa, ML, Nedi High

B:So like, (eintlik) ke choositse di subject tse, >cause of last year< ne ke etsa grade nine. ***R:****Mm.* **B:**Ke le confused. ke sa tsebe hore ko etsa eng? Haai ke utlwa bare physics he e thata? hey pure math- like, I know seka ke kene nou, cousin yaka e etsa di pure kaufela ne? ***R:****Mm?* **B:**So wa ntshwesa haai ↑it'sbetter ha u esta, pure maths >cause of<pure maths e straight. And then maths lit ba etsa ba le butsa ka di thapo tsa di ketlele? **R:***((laughs))* **B:**((laughs))	**B:**So like, (actually) I chose these subjects, >cause of last year< I was in grade nine. **R:***Mm.* **B:**I was confused. I didn't know what I was going to do? Haai I heard people say physics is difficult? Hey pure math- like, I know now that I'm in it, my cousin only doespure subjects ne? **R:***Mm.* **B:**So she told me haai ↑it's better if you do, pure maths >cause of<pure maths is straight. And then in maths lit they ask you about kettle cords? **R:***((laughs))* **B:**((laughs))

Extract 24, Katlego, M, Nedi High

K:Ko maths lit ne ke ke pulela hore hai! Maybe ya tswana le maths ya ko grade nine. Kobane bare, pure maths e buima. **R:***Mm.* **K:**Yabo'? And then, he ne ke- maybe? maybe- ne re so? N- ne re so fithle ko hole °wabo'° maybe ka? Learning ya teng wabo'? **R:***Mm.* **K:**Then, ne esale- ke ile? mo? Maths::lit.Two days. **R:***Oh ok?*	**K:**I told myself that haai in maths lit! Maybe it's like grade nine maths. Because they say, pure maths is hard. **R:***Mm.* **K:**Y'see? And then, if I- Maybe? Maybe we hadn't? W- we hadn't gotten far °you see° maybe with? Learning y'see? **R:***Mm.* **K:**Then, it was- I was? In? Maths::lit. Two days. **R:***Oh ok.*

K:And then, ya bu is' three, ang lata sir. Are ka Monday- akere re butse ka Wednesday. **R:***Mm?* **K:**Wednesday eo kaya le thrusday eo. And then ka::? Friday ang lata sir are tswan'tse ka Monday ang pone ke ko? ((fist in hand)) Pure maths. **R:***Mm.* **K:**((licks lips)) and then ka ya ko teng.	**K:**And then, on the third day sir fetched me. He said on Monday- we mos opened on Wednesday. **R:***Mm?* **K:**I went that Wednesday and Thursday. And then on::? Friday sir fetched me and said on Monday he should see me? ((fist in hand)) Pure maths. **R:***Mm.* **K:**((licks lips)) And then I went there.

Extract 26, Bulelwa, ML, Nedi High

B:Se ile nt'we kei phelang? Ke i thlwaetseng? Ke tseba hore, ke nna o tla etsang different. **R:***((nods))* **B:**Ha huo motho omong o etsang- unless, .hh he ho fihle motho ang offere something. It's unless, hole jwalo but. From now on ke nna o tla etsang different ya ko hesu. **R:**(*(nods))* **B:**So, °ke sharp ka yona.° Ya tsona ((laughs)) di keledi di yatswa, because of ((sniffles)) pelo e bohloko but. ((nods)) Ke nto e re pelang (ka yona). Ene kei tshwetsitse gore, .hh even le ha ke sena tshelete, ha se tse ke mo rekele something eu? **R:***Mm.* **B:**Mara ((stabs pen into her palm)) still ke mo (unclear). Ke nto e ke i tshwetsiseng yona.	**B:**It's the life that I live? I'm used to it? I know that, I'll do it differently/bring change. **R:***((nods))* **B:**There's no one else to- unless, .hh someone comes to offer me something. It's unless, it's like that but. From now on I'll do differently at home. **R:***((nods))* **B:**So, °I'm ok with it.° Yes ((laughs)) the tears fall, because ((sniffs)) my heart is sore but. ((nods)) It's what we live with. And I've told myself that, .hh even if I don't have money, when I buy her that something? **R:***Mm.* **B:**But. ((stabs pen into her palm)) I'm still(unclear). It's what I've told myself.

Extract 32, Katlego, M, Nedi High

K:Ha-uh, like, ko Bramfischer ne ke dula teng before ke tlo? Ke tla ko high school. **R:***Mm?* **K:**Ne ke dula le ntata mogolo waka le ngwana mamaka. **R:***Mm.* **K:**First born ya mamaka. Ne ke dula mo before re tla mo and then ha ke? ha ke ya ko high school. Are mamaka ke tlo dula mo. Kobane ko Branfischer ntate mogolo waka ha batle hore ngwana, ba mo cheeke wabo'? **R:***Mm.* **K:**Nare treata like, na sa batle hore ba re cheeke? Na batla hore re be? Ne re- ne rele spoiled. **R:***Mm.* **K:**Hantle hantle. ((licks lips)) Jalo mamaka are, hei? Ha uka dula ko Bramfischer u tla ba, hei? u tla ba le bana::? And then wa ganga wabo'? **R:***Mm.* **K:**Then,- from grade eight he like, ho dula mo Dlamini he.	**K:**Huh-uh, like, I used to live in Bramfischer before I? Came to high school. **R:***Mm.* **K:**I lived with my grandfather and my mother's child. **R:***Mm.* **K:**Her first born. I lived there before I came here and then when I? When I came to high school. My mother said 'Come live with me.' Because in Bramfischer my grandfather doesn't want kids to be scolded y'see? **R:***Mm.* **K:**He treated us like, he didn't want us to get scolded? He wanted us to be? We- we were spoiled. **R:***Mm.* **K:**Actually. ((licks lips)) Now my mother said, Hei? If you live in Bramfischer you'll, hei? You'll have ki::ds? And fool around y'see? **R:***Mm.* **K:**Then,- from grade eight then like, I lived in Dlamini then.

Extract 33, Katlego, M, Nedi High

R:*So what do you think, that, mme wagao-gore mme wagao. U nagana gore mme wagao u wisha eng for bophelo ba gao?* **K:**Nna mamaka u wisha hore, ke ka? ceta skolo? Ke sena ngwana maybe wabo'? Kobane vele ↑vele bana babangata motho hakare maybe sixteen u bale ngwana? And then mamaka u ba proud hore u tlare wena at least ngwanaka, hore e (di nto) wa reacha nou? E n- ha ona ngwana? U e tswere hantle kobane vele ↑vele nna ha kele ko hesu kea behava. Nka sere hei! Mamaka bang phonela ka tsamaya. A? keadula le mamaka? And then wa wisha hore hei! I wish hore ngwanaka a ka fetsa skolo a sebetse? **R:***Mm.* And then, ke be hantle.	**R:***So what do you think, that, your mother-that your mother. What do you think your mother wishes for you?* **K:**My mother wishes that, I would? Finish school? Without a child maybe y'see? Because really lots of kids reach sixteen with kids of their? And then my mother she's proud to say 'at least you my child, you're reaching up? E n- you don't have a child? You conduct yourself well because really at home I behave. I won't say 'Hei! Ma they've called and I'm going out.' A? I spend time with my mother? And then she wishes that hei! I wish that my child can finish school and work? **R:***Mm.* And then, I'll be ok.